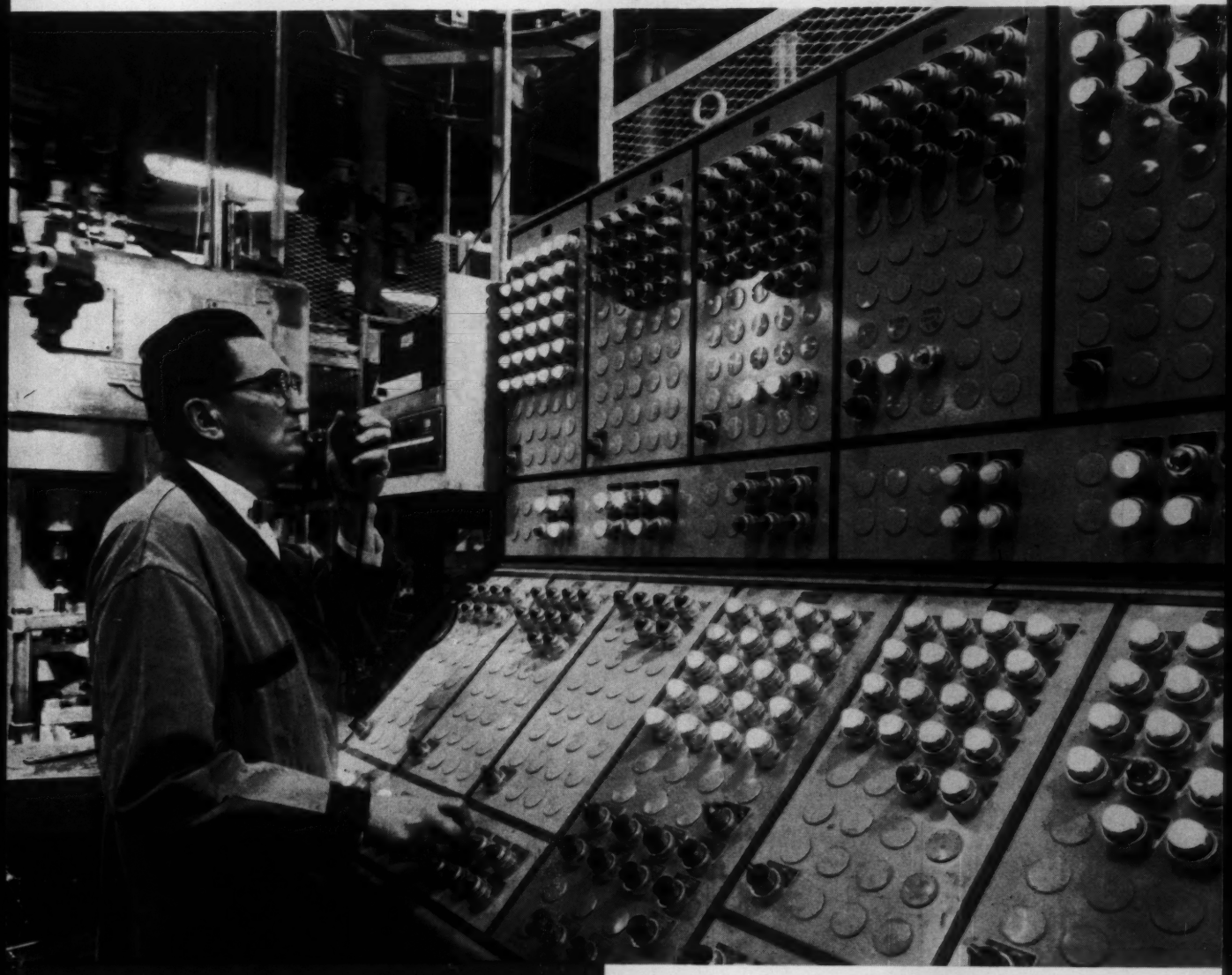
The IRON AGE

January 28, 1960 A Chilton Publication The National Metalworking Weekly

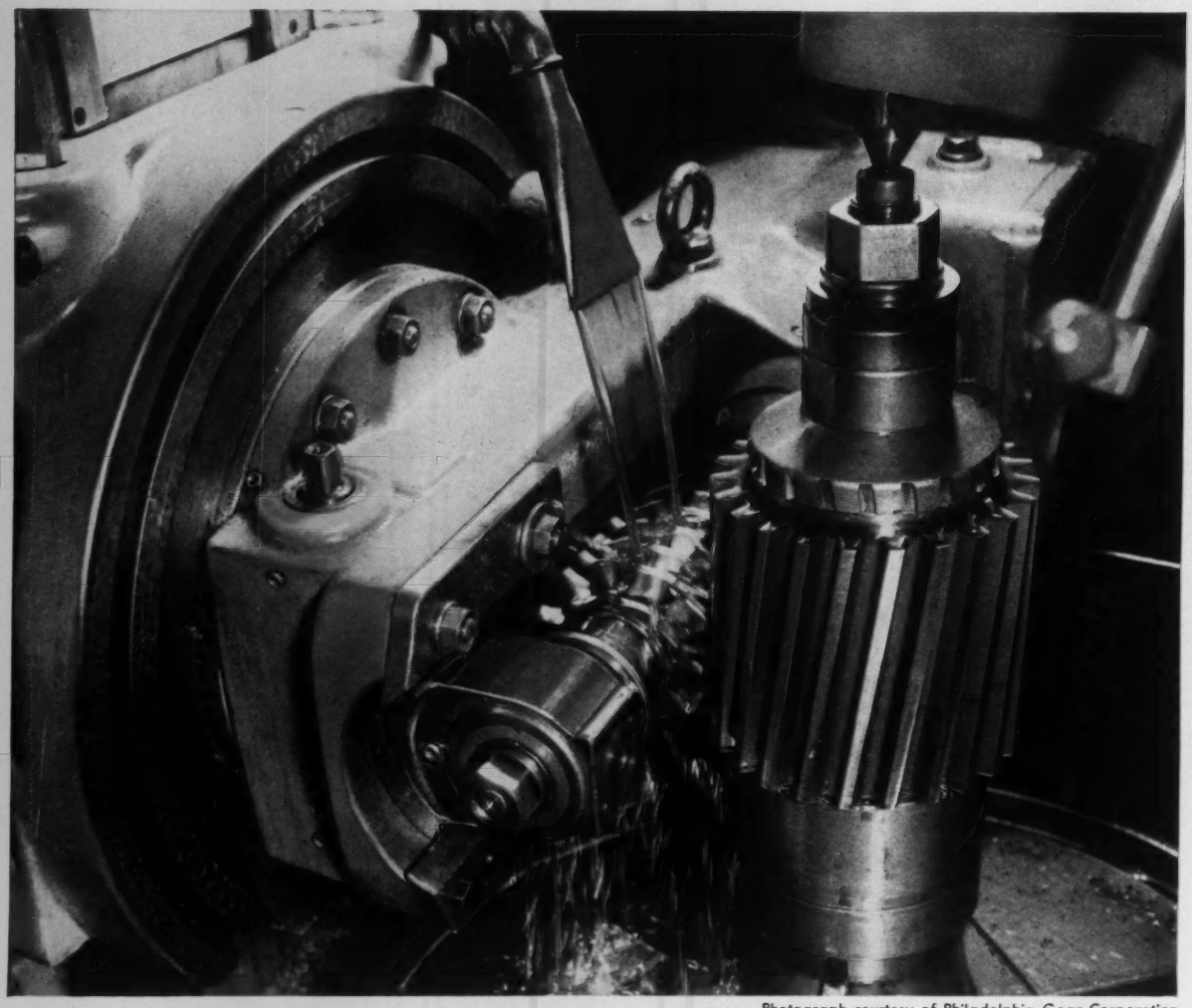


Teamwork Pays Off In Planning Transfer Lines P. 89

Has Ike Helped Depreciation Reform? – P. 43

How Steel Production Map Is Changing – P. 53

Digest of the Week – P. 2-3



Photograph courtesy of Philadelphia Gear Corporation

Aristoloy LEADED* provides freer machining with no sacrifice of tensile strength at PHILADELPHIA GEAR

ARISTOLOY STEELS

The very qualities that make good gear steels—high-tensile strength, extreme wear and load resistance—make them difficult and expensive to machine.

Philadelphia Gear Corporation solved this problem by switching to Copperweld leaded steel.

This helical gear, for example, is being cut from a bar of Aristoloy 4140 leaded which has been heat treated to a 300 to 320 Brinell Hardness. The lead addition permits an increase in spindle RPM, increased hob feed and improvement in the number of pieces per tool grind.

But none of the desirable strength qualities required of a gear steel are reduced by the minute lead particles. They act as built-in lubricant and in no way affect the physical properties.

Write today for Leaded Steel booklet or new Products & Facilities Catalog.

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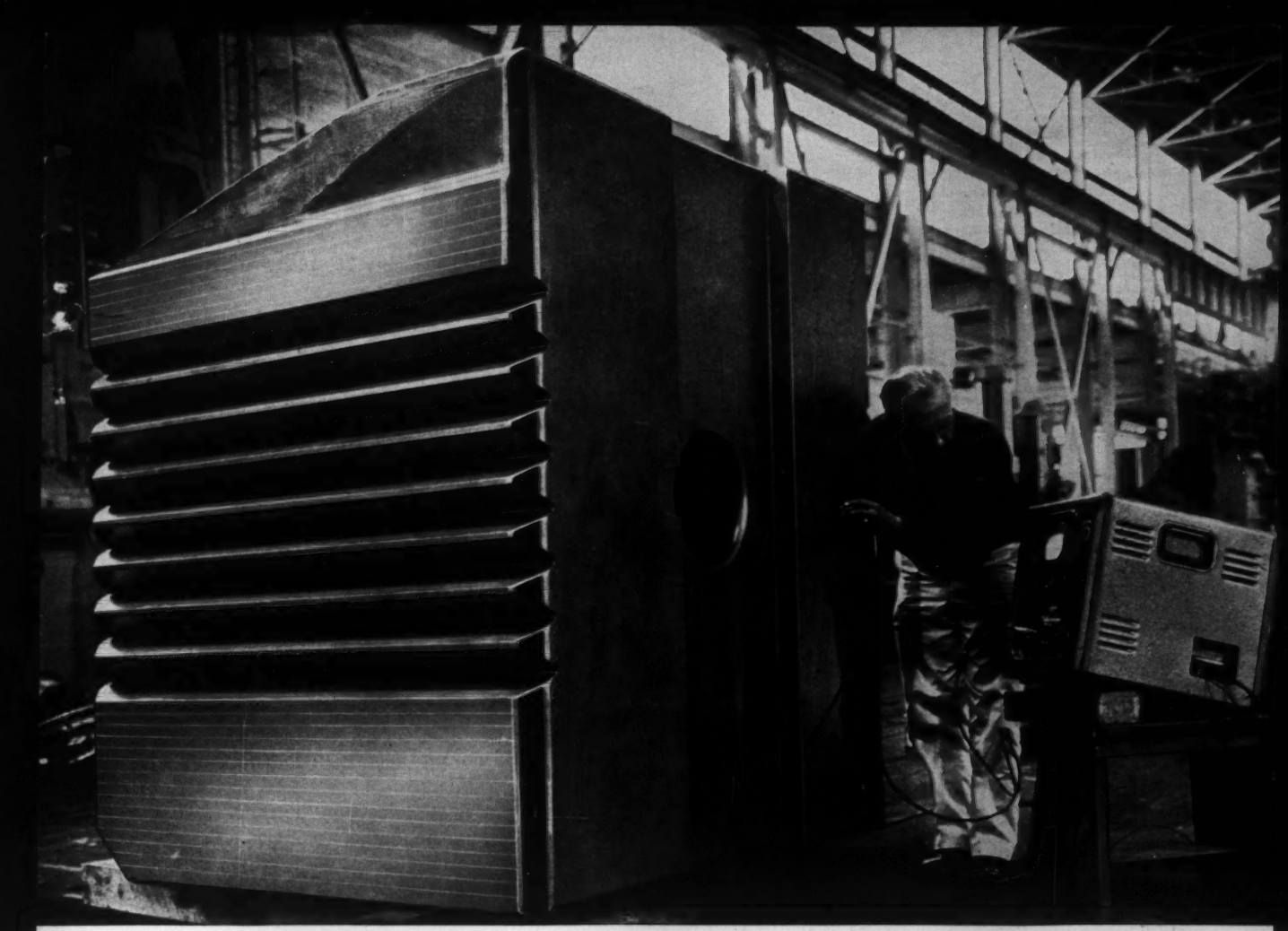
COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.



We think it's the largest forged hammer ram ever made

It weighs in at 50,000 pounds. And it measures 54¼ inches from top to bottom—59⅜ inches from side to side—66 inches from front to back. Here at Bethlehem, we've never heard of a larger *forged* hammer ram. Have you? If so, we'd certainly like to know the details. Would you be good enough to drop a line or two to Forgings Sales? (And end our suspense over whether we've chalked up another record, or an also-ran?)

A few other facts about this hammer ram: we forged it from nickel-chrome-molybdenum-vanadium steel; we heat-treated and tested it to our customer's specifications; and, as you can see, we furnished it finish-machined, ready to start pounding in a steam drop hammer.

Although this ram is surely a giant in its class, it's a pygmy compared to some of the forgings we've made. Our shops turn out the largest forgings ever needed—some weighing over 200 tons. (Some of the smallest, too—drop forgings, for example, that weigh as little as one pound.)

Call us when we can be of service to you or members of your staff. Our engineers will gladly cooperate, from the planning stage to the finished product—whatever the type, size, or design of forging you require.

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Chestnut and 56th Sts.
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THE IRON AGE, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Second class postage paid at Philadelphia, Pa. Price to the metalworking industries only or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $25; other Foreign Countries, $35 per year. Single Copies 50¢. Annual Review Issue $2.00. Cable: "Ironage," Philadelphia.

The IRON AGE

January 28, 1960—Vol. 185, No. 4

Digest of the Week in

★Starred items are digested at right.

EDITORIAL

Government Spending: It Adds To Inflation Fires 7

NEWS OF INDUSTRY

★Will Ike's New Proposal Help Depreciation Reform? 43
Who Got Big Defense Contracts 45
★Does Industry Lag in Isotope Use? 46
★Houses: Good Market for Metals 47
★Malleable Record Tied to Autos 48
★Pittsburgh Steel Loses T-H Vote 49
★Warehouse Steel Stocks Rebound 50
Foreign Furnaces Pose Threat 51
Steel Spending 52
★New Steel Capacity 53
The IRON AGE Salutes 63

FEATURE ARTICLES

★Keys to Better Transfer Lines 89
★Uses for Oriented Graphite 92
★Improving Foundry Cores 94
★How to Double Iron Yields 96
System Stacks Steel Quickly 99
★New Stainless Alloy 100
★Cryogenics Research 102

NEWS ANALYSIS

Newsfront 9
Report to Management 65
★Automotive 67
Washington 71
West Coast 73
Machine Tools 75

MARKETS & PRICES

Market Planning Digest 41
★The IRON AGE Summary 125
★Purchasing 126
Iron and Steel Scrap Markets 130
Nonferrous Markets 132

REGULAR DEPARTMENTS

Letters From Readers 13
Industrial Briefs 76
Men in Metalworking 83
Free Literature 108
Design Digest 115
New Books 117
New Equipment 118

INDEX TO ADVERTISERS 145

NEWS ARTICLES

DEPRECIATION

Ike's Proposal — The president wants higher taxes applied to profits from the sale of used equipment. In return he promises more liberal tax writeoffs. P. 43

RADIOISOTOPES

Missing a Bet—Experts on radioisotopes charge that industry is missing out on potential savings. Among misconceptions: The wide belief that working with them is hazardous. P. 46

HOME BUILDING

Good Metals Market — While housing starts are expected to be fewer in 1960 than in 1959, the home building industry will still offer a prime market for metalworkers. More prefabricated homes will use more metal, especially aluminum. P. 47

MALLEABLE CASTINGS

Autos Are Key — Producers of malleable iron castings look forward to their second best year. And if automakers come close to producing 7 million cars in 1960, shipments could exceed 1955's record of 1.1 million tons. P. 48

T-H ELECTION

At Pittsburgh Steel — The company bucked tremendous odds to try and win worker support of cuts in incentive pay. The company's

Metalworking

◀ COVER FEATURE

TRANSFER LINES—Close liaison between the machine builder and the user insures the greatest efficiency from automation. Saginaw Steering Gear Div., General Motors Corp., knows how such teamwork pays off in its automatic transfer line. P. 89

financial position was stressed to convince workers that support would help protect their jobs. P. 49

STEEL CAPACITY

Increased 937,000 Tons—During 1959 the nation's steelmaking capacity rose to 148.5 million tons. Both oxygen and electric furnace installations made gains. P. 53

FEATURE ARTICLES

ORIENTED GRAPHITE

Unusual Properties — No longer a lab curio, oriented graphite is now on the commercial market. This material conducts heat 500 times better along its surface than through it. As such, it should help solve many problems in high-temperature fields, including nuclear reactor work. P. 92

BETTER FOUNDRY CORES

From Corn-Base Binders—Two varieties of core binders now team up to improve foundry cores. One increases green strength; the other improves baked strength. Together, these corn-base binders produce cores with better dimensional stability and surface finish, plus higher scratch hardness. P. 94

DOUBLING IRON YIELDS

Wholly Practical—It's not only possible but economical to boost iron yields from a blast furnace. All it takes is this newly-designed high-pressure furnace. At present, several of these furnaces are operating in Europe at top pressure of 25 psi gage. P. 96

HEAT EXCHANGER TUBES

Made From New Alloy—In a case history from an Oregon foundry the role of the metallurgist is emphasized. Relying on a device that controls the amount of ferrite at the furnace, the metallurgist was able to find the new alloy that a petro-chemical plant needed. P. 100

CRYOGENICS RESEARCH

More of It—Cryogenics is on the way to revolutionizing many facets of industry, including motors, computers and power equipment. A new lab devotes all its energy to the unusual low-temperature science. The present goal of the lab: The perfect gyroscope. P. 102

MARKETS & PRICES

SERVICE CENTERS

Stocks Rebound—Steel inventories in service centers are making a fast recovery from the low point reached in mid-December. Most items should be in balanced supply by the middle of the second quarter. P. 50

AUTOMOTIVE

Horsepower Race—While it may be officially dead, automakers failed to bury the horsepower race. Automakers continue to offer big engines as options. And now they are bringing out bigger engines as economy car options. P. 67

STEEL SUMMARY

Look to Detroit — Near-record auto production holds the key to the steel market. As long as it holds up, the market will stay tight for all products with any automotive market. P. 125

PURCHASING

Direct Heating — Gas-burning radiant heaters are making a break through into the metalworking and other industries. New plants are being heated this way and heat savings are reported. P. 128

NEXT WEEK

INDUSTRIAL PRICES

The Outlook — Overall purchasing costs will average two to three pct higher in 1960. But why? Next week's special report on the price outlook analyzes the forces that will affect industrial prices through 1960.

EXPLOSIVE HARDENING

On Manganese Steels — Next week's technical feature describes velocity impact hardening and how it is used to best advantage on Hadfield manganese parts. This unusual technique treats irregular surfaces evenly with little deformation.

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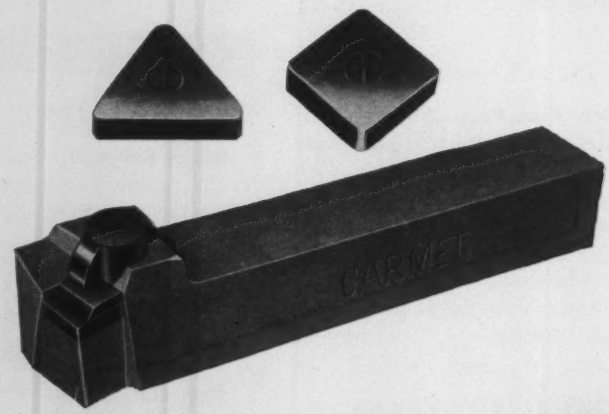

145

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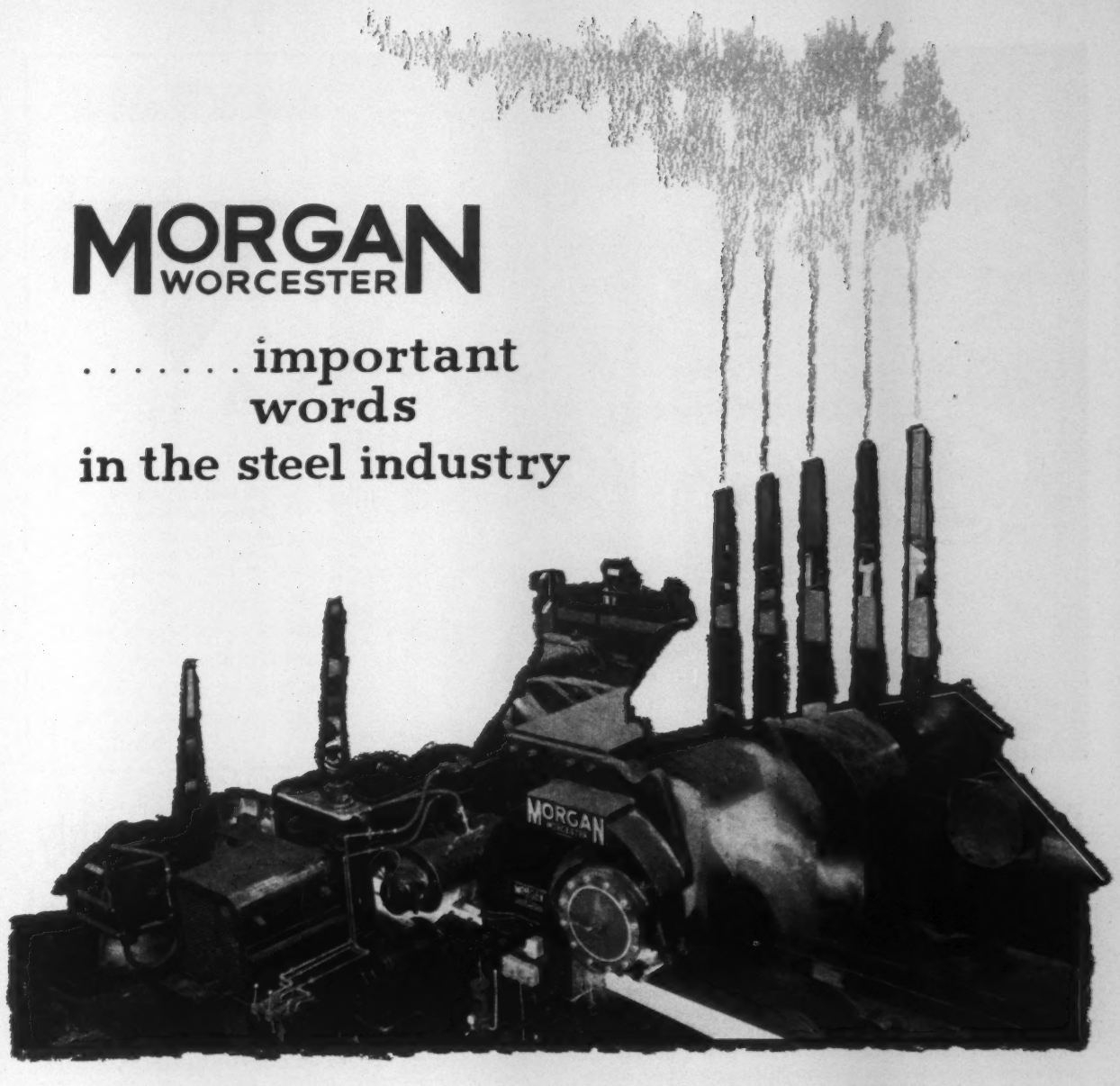

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RM-76

New steels are born at Armco

Tank head (top), bracket (bottom), and control valves (center) illustrate the great workability of Armco ZINCGRIP.

Brady cuts costs, simplifies design, speeds assembly, improves performance with Armco ZINCGRIP Steel

Rust resistance of Armco ZINCGRIP® Steel helps water pressure tanks and controls manufactured by Brady Air Controls, Inc., Muncie, Indiana, provide the trouble-free service home owners want. Workability of this special hot-dipped, zinc-coated steel also means cost-cutting production advantages, especially in fabrication of air volume control valves.

ZINCGRIP replaces die-castings

Originally, valves were two cup-shaped die-castings, joined by bolts, with a diaphragm between them. Now halves are formed from ZINCGRIP Steel and the diaphragm inserted. Both parts are then securely locked together by a reverse draw that creates an airtight seal. Rust is sealed out, too, because ZINCGRIP's tight coating does not flake or peel despite this severe fabrication.

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Government Spending: It Adds to Inflation Fires

If you are toying with the idea that we have the inflation problem licked, watch out! Take a look at the national budget.

As long as we are spending such fantastic sums each year for non-defense items, we are in trouble. When we talk optimistically about tax cuts because we see a mirage-like surplus, it is dangerous.

If we take the President's budget proposals at face value, we are on shaky ground. Government may spend more money than suggested. We may take in less revenue than Mr. Eisenhower estimated. At best, his budget with its $4 billion surplus is a precarious document.

It is self-hypnotism to call an overage of $4 billion in one year a surplus when we had a deficit of $12.4 billion in 1959. It will take a much larger surplus to make a dent in our national debt of $284.5 billion. And we must make a dent!

We will probably spend more in future years. A much smaller surplus than is now envisaged for 1961 may turn up. Farm aid is a tricky thing. It can climb above estimates. Recessions don't always obey the commands of politicians—or the wishes of Federal revenue guessers.

The best that we can hope for—and fight for—is that Congress will do some of the things Mr. Eisenhower has proposed. We also must hope that it will not do the things that will lose revenue and increase government costs.

So we come to inflation again. Those who insist that wage-price push-and-pull causes all our troubles are only partly right. Vast and inordinate government spending is evil for the people too. Time may prove that it is the main and most devastating inflationary culprit.

With the 1961 fiscal budget a second peacetime record, it is about time that we quit kidding ourselves. We will hear the usual argument that as long as we are growing we can afford to have more red figures, more spending, and more services for the people.

That's a whole lot like arguing that a fellow ought to go deeper in the red because he is older, needs more of everything and some day he will make enough to pay his debts. It doesn't work out that way in daily life: Why should it in government?

Inflation is with us. It isn't going away unless we do something about it. If we don't, then we all must suffer the consequences.

And they are not going to be pleasant!

Tom Campbell

Editor-in-Chief

METALOGICS

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RYERSON PLUS VALUES

...how it works for you

Broadens Scope of Selection

Know a single source where you can get aircraft-quality alloys such as 9310, Nitralloy, and 4340 to A.R.T.C.-14 . . . as well as all standard commercial alloys and free-machining types? This is typical of the size and diversity of Ryerson stocks. Here, right at the tip of your dialing finger, are thousands of tons of steel and aluminum—in virtually every standard type, size and shape. Also, hard-to-get intermediate sizes and special analyses are readily available. This is true of Ryerson stocks, year in and year out—in all but periods of extended production shutdowns.

Brings Newest Developments

Remember when lead was first added to carbon steels for faster machining...when, a little later, leaded alloys came along? Ryerson stocked them for you first. And remember just recently when the world's fastest machining steel tubing and bars (Ledloy® 170 tubing and Ledloy 375 bars) were introduced? Again, Ryerson brought them to you first.

Gives New Measure of Quality

Quality—now there's a word that's worn thinner than an office-seeker's shoe sole. But Ryerson Metalogics has given it new meaning, with a brand-new set of rigid quality-control standards that are completely detailed and published for your scrutiny. They govern every aspect of specifications, verification, packaging, cutting and certification of all Ryerson products. If you want a tangible example of the scope of this new quality program, take a good look at Ryerson cutting tolerances. Then see if you can find any that are held more closely.

Provides Best Technical Help

"Expert" is another worn-out word we hesitate to use. But we do put at your disposal the industry's most experienced men. They're ready to give you the benefit of their nationwide, daily experience with all kinds of problems—material selection, fabrication and the ever-present specter "cost of possession." And remember, nowhere else will you find as wide a range of published technical information to help you in your metalworking operations. It's yours for the asking.

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Here's a company you should get to know better for our primary business is that of satisfying customers. And we've kept a lot of people satisfied over the last 100 years. We'd like to satisfy you, too.

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Adhesive Strength Tests

Low-temperature behavior of several structural adhesives, for bonding metal sheets, has been investigated by the National Bureau of Standards. The adhesives checked at temperatures ranging down to —424°F were: a filled epoxide, three rubber-phenolics, four vinyl-phenolics and two epoxy-phenolics. In a series of tensile tests, the epoxy-phenolics gave the best bonds.

Prevents Metal Corrosion

Aluminum alloy anodes achieve effective, low cost control of severe corrosion—chronic plague of steel ballast tanks in ocean-going ships. Long useful life per pound and light mass of the cast aluminum anodes provide substantial dollar savings.

How to Cut Assembly Time

High-speed riveting machines feed and set tubular and semi-tubular rivets. Track mechanisms feed the rivets to the jaws. Slide fixtures position the workpiece; then trip the machine when the workpiece reaches the riveting position. This patterns riveting to highly mechanized assembly methods.

Silicate Acts as Binder

Silicate provides the binder in a sealant for radiators and engine blocks. The sealant consists of 5 gal of silicate, 5 lb of powdered asbestos mixed with charred bone meal, and 1 oz of ammonium chloride fluid. Under heat, the sealant flows into leaking cracks. It dries to a solid coating.

Tinplate Takes Offensive

Tinplate producers move on the offensive in their battle with aluminum. U. S. Steel's Roger Blough told can makers last week that his company is working on a new thin-gage tinplate. No details were given. However, Japanese mills are already making tinplate that's less than half the thickness of most commercial grades. Using the thin stock, a pie plate weighs less with tinplate than with aluminum. Beer cans and frozen juice cans offer a big potential market.

Steel Productivity Up?

For President Eisenhower the magic words are "steel productivity." And the magic number is 3½ pct. The administration feels this combination adds up to the "growth" that the President forecast in his economic report. Presidential advisors expect a 3½ pct improvement in steel productivity to offset the 3½ pct increase in costs caused by the wage hike.

Diffuses Chromium

A new process, similar in many respects to gas nitriding or carburizing, diffuses chromium into the surface of ordinary steels. Result: A low-cost uniform, corrosion resistant surface that can be welded and fabricated. One test muffler, still in serviceable condition, logged over 500,000 engine hours.

Single Crystals Give Key

Molecular electronics uses components such as germanium crystals, produced by the dendrite process, to reduce size and weight of electronic equipment. Scientists develop semiconductor crystals in forms, requiring no material removal, that make suitable transistor wafers.

Control Powdered Metals

Powdered metal parts makers show interest in electrohydraulic vibration test equipment. With such equipment using ultra-high-speed servo valves, it's possible to combine constant and rapidly fluctuating pressures—from 0-800 cycles per second—to obtain a substantial improvement in powdered metal quality and finish. Exciter type controls regulate the magnitude of superimposed frequency and force-time curve shapes.

Did a two-belt job handling red-hot coke

You'd look a long time to find a tougher conveyor job: tonnage is heavy—coke is highly abrasive—it's handled glowing hot—and it's side-loaded on the belt, an invitation to uneven wear. So, all things considered, management wasn't too unhappy with a 700,000-ton average from belts at this big steel mill's coke plant.

But the G.T.M.—Goodyear Technical Man—knew he could do better than that. His recommendation: a special Style B conveyor sinewed with plies of heavy-duty rayon to defy the abusive service.

And he was right again! In fact, the G.T.M.'s belt hustled almost 1,500,000 tons—better than twice the average of those previously used. And because it troughed better and trained more readily, it proved far easier to reverse for more equalized wear—held its fasteners better—needed less maintenance all around.

And that's just one more case where the G.T.M. had the answer—where competition had fallen far short. To put him to work on your problem, contact your Goodyear Distributor—or write Goodyear, Industrial Products Division, Akron 16, Ohio.

• • •

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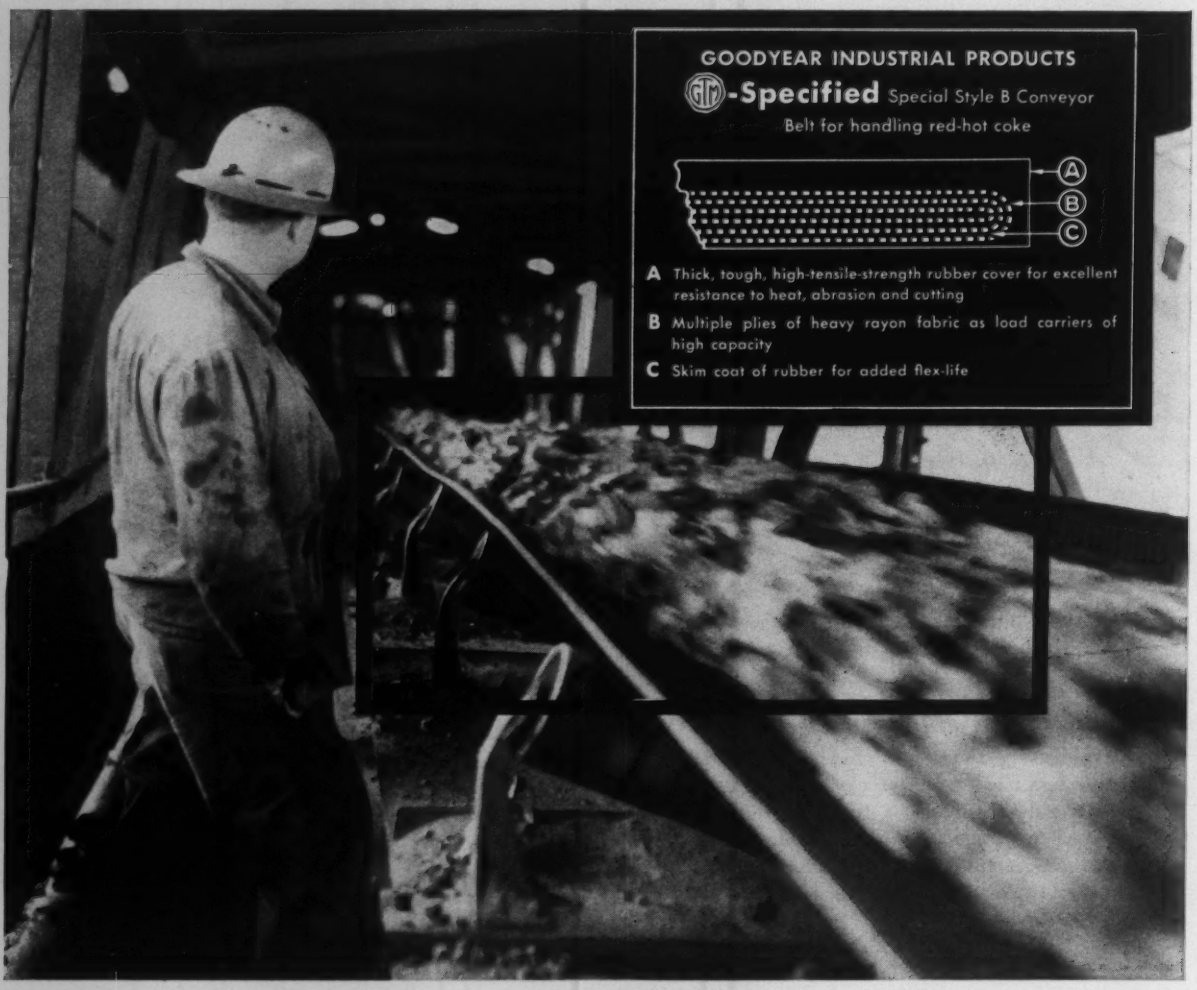
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B Multiple plies of heavy rayon fabric as load carriers of high capacity
C Skim coat of rubber for added flex-life

CONVEYOR BELTS BY

GOODYEAR

THE GREATEST NAME IN RUBBER

The Isotope Story

Russia has put the radioisotope to many uses in industry. At a symposium last week, government and industry scientists were trying to encourage more American industrialists to use them too. (See page 46).

One advantage the Russian's have, said Dr. A. J. Stevens, is that they don't have to try to sell a good thing. They just order it done. And the result is that they are saving millions of dollars. Meanwhile, some U. S. companies have to be hard-sold on ways that will benefit them.

A Comparison—At the meeting, Dr. Paul C. Aebersold, director of the Office of Isotope Development, AEC, confided to one of our editors: "Atomic research is just like sex. It isn't talked about too much in public, and it's practiced in secrecy."

The symposium to encourage business interest in isotopes was held at Philadelphia's Franklin Institute.

Guess Who?

NOTICE: All employees will have Saturdays and Sundays off.

A sign something like this may be appearing in West German factories soon. Working hours there are being reduced and many industries are trying to introduce a two-day weekend.

Also, firms are taking a greater interest in what their workers do in their off hours. The management of Phoenix-Rheinrohr A.G., member of the Thyssen group, manufacturers of steel and pipe, is encouraging its employees to take up creative hobbies. And each year a contest is held to determine the best.

Whittle After Work—Last year one of the winners, Joseph Geurtz, a worker in the Ruhrort works, carved a chess set. This isn't too unusual as many Europeans whittle away in their spare time. But Mr. Geurtz's chessmen were modeled after people at the plant.

And guess who the king was? Right! The plant director. And the queen was the secretary. (We hope the director's wife understood.)

The pawns resembled co-workers. But one knight looked pretty much like Mr. Geurtz himself.

Other activities capturing the hearts of the plant's workers include a quartet specializing in progressive jazz, several soccer teams, and one chap who is the life of the office parties. A part time actor, he is available for all functions.

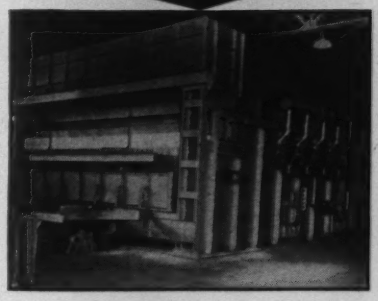
Nickel a Loaf

Rumors that International Nickel and Wayne Pump are about to merge have been denied in the highest circles. Too bad too, because we had heard they were going to make pumpernickel.

Silly? Of course, so let's have your suggestions for the most improbable merger. No prizes, just glory.

Sorry.

FIRST CHOICE FOR PIPE ANNEALING



R-S CAST IRON PIPE ANNEALING FURNACES USED BY EVERY LEADING PIPE FOUNDRY

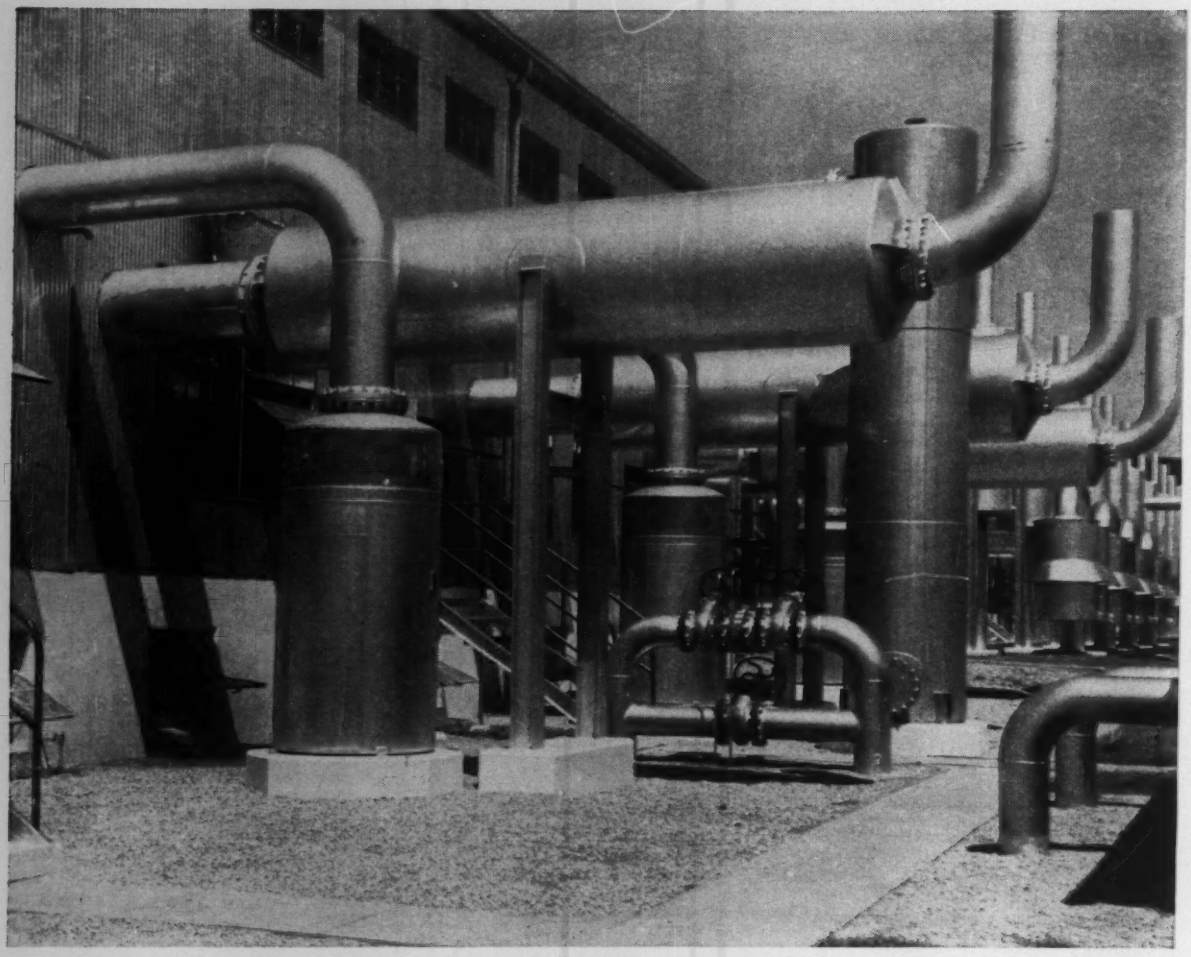
For more than 35 years leading producers of centrifugal cast iron pipe have relied on chain conveyor type annealing furnaces designed and built by R-S.

R-S experience goes back to the first centrifugal cast iron pipe produced in this country more than 35 years ago. Since then cast iron pipe annealing furnaces have been a specialty with R-S engineers. Their experience and development of furnaces to meet the needs of annealing cast iron pipe has kept pace with the industry. Today, R-S pipe annealing furnaces offer greater uniformity of heating through all ranges and precision controlled cooling.

R-S pipe annealing furnaces range in capacities from 15 to 35 tons per hour. Write for complete information on the newest developments in centrifugal cast iron pipe annealing by R-S.

R-S FURNACE COMPANY, INC.
NORTH WALES, PA.

R-S FURNACES



"Sound Engineering"
pays off with precision stampings

Silencing high-energy exhaust gases from powerful stationary engines calls for snubbers that can take years of explosive pressure without mechanical failure.

Burgess-Manning Snubbers handle the job with a heavy-gauge cylindrical pressure vessel type construction, continuously welded throughout. Their scientifically engineered multiple chambers prevent, rather than muffle, noise by converting exhaust "slugs" to a continuous flow.

Ends of these cylindrical vessels must meet the same exacting standards. And, Burgess-Manning relies on COMMERCIAL for the ends of their snubbers.

COMMERCIAL's complete facilities prove a dependable "one source" with dies in existence to cover Burgess-Manning's entire size range requirement. Diameters 24", 30", 36", 42", 48", 54", 60" and 72"—each in proper thickness to meet any pressure requirement.

Through its extensive "Die Bank", COMMERCIAL has made its standard metal shapes available to O.E. manufacturers for over 30 years. Drawing from over 20,000 components, dies can be assembled to form economical metal component parts having higher functional efficiency. Many unusual parts have been put up to COMMERCIAL to produce which, with slight modification to fit the "Die Bank" pattern, have resulted in customer cost benefit. Specials often require only partial tooling cost.

COMMERCIAL engineering assistance is always available to help you make the most advantageous use of this important service. Before starting your next job, write for Catalog 200-C1 which details all standard shapes and dimensions available. Address: Commercial Shearing & Stamping Company, Dept. K-5, Youngstown 1, Ohio.

Specialists in the shape of things to come
CUSTOM STAMPING • UPSET FORGING • ROTOFORMING

COMMERCIAL
shearing & stamping

All Aluminum?

Sir—I feel you are doing iron and steel a disservice by referring to the Corvair's engine (Jan. 14, page 30) as an "all-aluminum" engine.

How can it be an all-aluminum engine when all the vital parts, namely crankshaft, connecting rods, piston pins, cylinder liners, piston rings, timing gears, valves, valve springs, push rods, rocker arms and valve lifters are made of iron or steel? Not only the Corvair but all so-called "all-aluminum" engines are built the same way.—W. Boelter, Saginaw, Mich.

▪ **Mr. Boelter is technically correct. We've been caught writing in the jargon of the trade.—Ed.**

Feature Article

Sir—I would appreciate having 25 copies of the feature article in the December 24 issue "Inspect Hot Steel Blooms Without Slowing Production." If you can supply these copies I will distribute them among the Engineering Physics students in my class in Materials and Metallurgy. It is an excellent example of the industrial application of electron accelerators.—J. O. Jeffrey, College of Engineering, Dept. of Engineering Mechanics and Materials, Cornell University, Ithaca, N. Y.

Sir—Please send me one copy of the article.—W. C. Rion, Engineering Service Div., E. I. Du Pont De Nemours & Co., Wilmington.

Sir—Please forward two reprints of the article.—C. T. Zimmermann, Staff Engr., Automation, American Steel & Wire Div., U. S. Steel Corp., Cleveland, O.

Sir—We would be pleased to receive three reprints of your feature article "Inspect Hot Steel Blooms Without Slowing Production."—G. T. Haig, Interprovincial Steel Corp. Ltd., Regina, Canada.

Sir—We would be most appreciative if six copies of the featured article were forwarded to us.—A. N. Haig, Engr. in Charge, Accelerator Section, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

▪ **Reprints have been sent.—Ed.**

An Omission

Sir—It came as a disappointment to me as one of your avid readers and advertisers to find the name of our organization missing in the list of "1960 Directory of Trade Associations" in your January 7 issue.

It was reassuring to find that our technical people, the Tin Research Institute, were listed, however.—R. D. Coursen, Director, The Malayan Tin Bureau, Washington, D. C.

▪ **We apologize for the oversight.—Ed.**

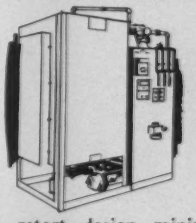
"Come back here, Hoffman, I'm not through firing you yet."

EDWARD F. GRADY
Atmosphere Equipment Specialist, reports . . .

GAS GENERATOR ON LINE OVER 9000 HOURS WITHOUT ELEMENT CHANGE

C. I. Hayes Type IGL-1004 Endothermic Gas Generator installed at a nationally-known mold die firm* has been operating at 1850°F on a steady cracking process for over 9000 hours without change of heating elements. Why such outstanding performance?

Rugged Construction and Good Design provide extra life insurance. A new Hayes retort assures maximum utilization of catalyst. Straight-



through retort design minimizes downtime due to catalyst change. On this installation, catalyst was changed in less than 3 hours. Original catalyst lasted 4800 hours . . . even better service is expected of the recharge.

New Ceramic Heating Elements — having practically constant resistance — add extra months of service life. Elements can be connected directly across the line . . . need no tap transformers . . . are easily replaced without shutting down the generator. Here's real economy!

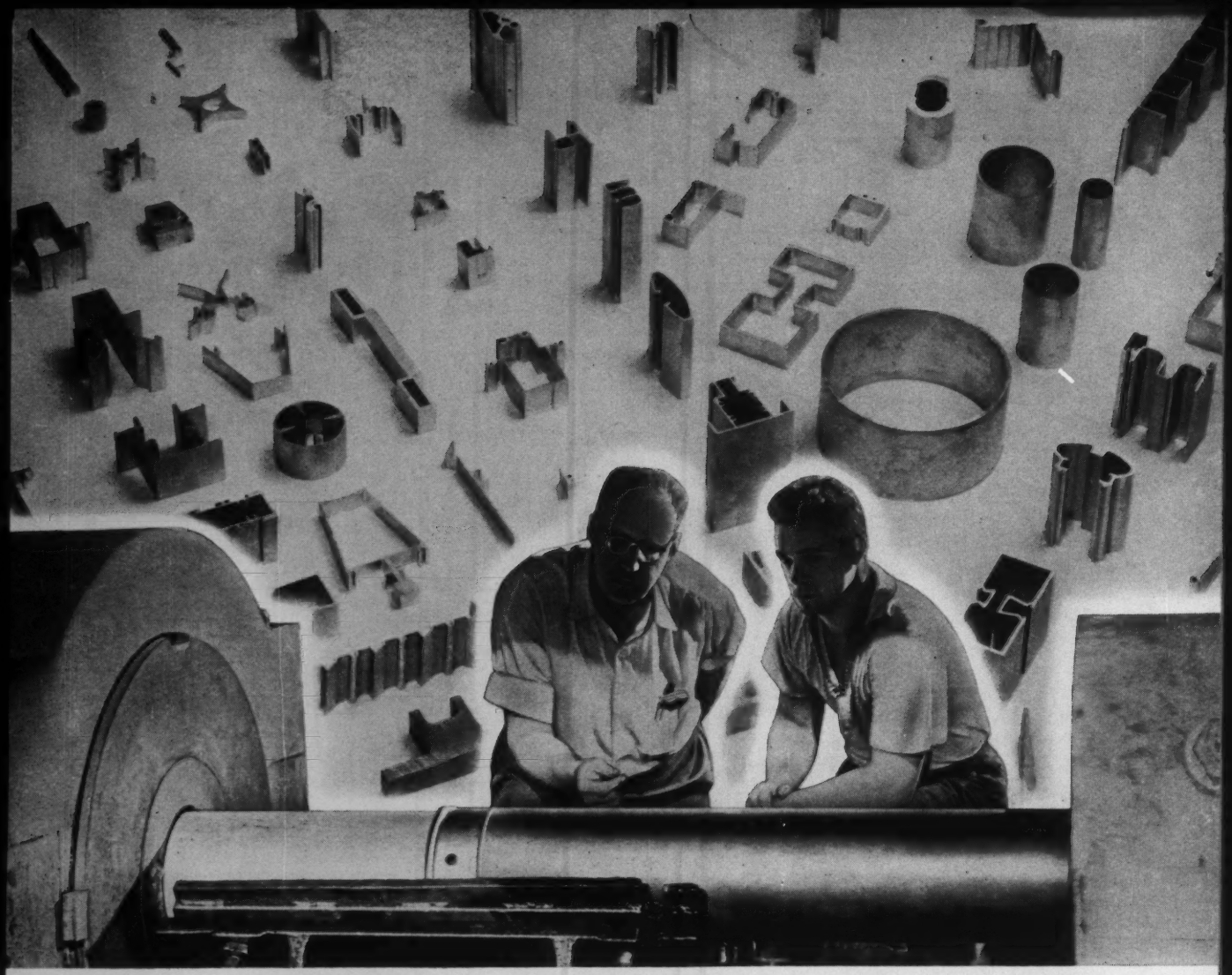
Wide-Range Flexibility and Precise Control are the mark of the Hayes IGL-1004. This "endo" generator can supply low *or* high carbon-potential atmospheres for jobs like copper brazing, annealing of steel, sintering of iron compacts, carbonitriding, etc. Wide span heating provides reserve capacity. Flexibility of temperature range — especially at higher ranges — can be utilized to the maximum . . . for maximum output at lowest dewpoints without fear of burn-out.

Bulletin 5808A gives all facts on IGL-1004. Write for your copy today.

*Name of installation on request

C. I. HAYES, INC.
Established 1905
821 WELLINGTON AVE. • CRANSTON 10, R. I.

It pays to see HAYES for metallurgical guidance, lab facilities, furnaces, atmos. generators, gas and liquid dryers.



This billet makes the toughest sections easier...less costly!

ALCAN BILLET gives you extrudability that's noticeably better... less costly! So much so in actual practice that many extruders pushing tough sections specify ALCAN billet exclusively.

Made entirely of clean primary metal and cast to the industry's closest tolerances—ALCAN billet may well be the most economical you can use. For it gives you every fabricating advantage—it pushes easier, faster... gives you longer die-life... higher recovery... and better quality of finished product.

Telephone our nearest office today about a trial run on ALCAN extrusion ingot. We welcome the chance to show you how it can increase your profits and productivity.

Aluminium Limited

ALCAN

Ingot Specialist...serving American Aluminum Fabricators—

Aluminium Limited Sales, Inc., 630 Fifth Avenue, New York 20, N. Y. • CLEVELAND • CHICAGO • LOS ANGELES • DETROIT • ATLANTA • ST. LOUIS

COMING EXHIBITS

Plant Maintenance & Engineering Show — Jan. 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Tool Show—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

MEETINGS

JANUARY

Assn. of Steel Distributors, Inc.—Convention, Jan. 30-Feb. 6, El Mirado Hotel, Palm Springs,

(Continued on P. 16)

New Kidde carbon dioxide portables awarded highest U.L. rating!

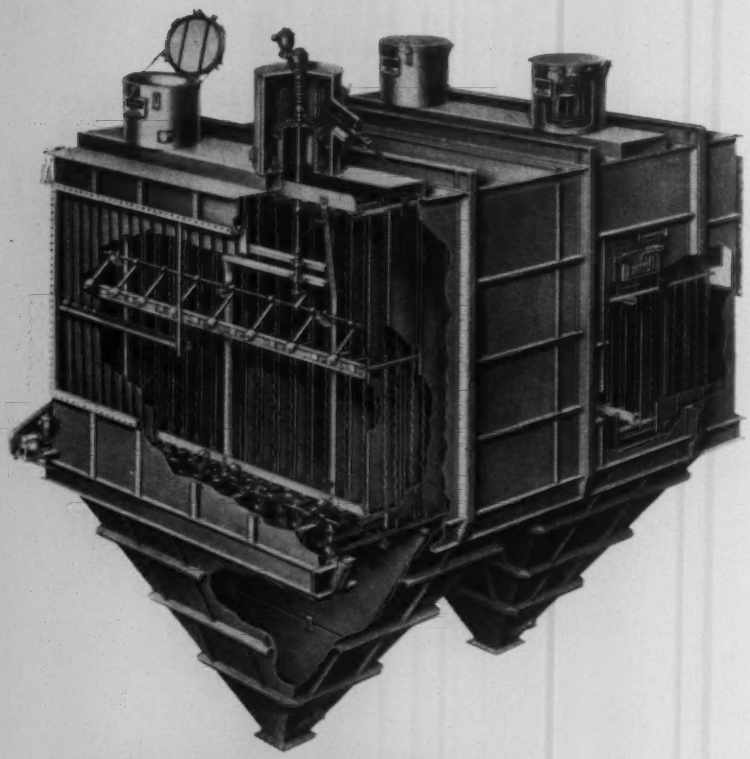
Belleville, N. J. — A spokesman for Walter Kidde & Company announced here today that four of the company's new portable fire extinguishers have been awarded the Underwriters' Laboratories highest ratings for their respective capacities. To those interested in fire safety, this means that, pound for pound, these new Kidde units have more fire-killing power than any other carbon dioxide extinguishers on the market today.

Available in 15 and 20 pound capacities, in either squeeze valve or trigger models, these power-packed Kidde units feature new hose and discharge horn assemblies, which are responsible for their extra fire fighting ability. The new assembly is supplied also with Kidde's 10 pound carbon dioxide portable which has a U. L. rating not exceeded by any other extinguisher of its capacity. This hose-horn combination is also being offered as a replacement unit for existing 10, 15 and 20 pound carbon dioxide units, and when attached will upgrade their effectiveness equal to the new ratings.

For more information on these top-rated Kidde carbon dioxide portables write Kidde today.

Kidde

Industrial and Marine Division
Walter Kidde & Company, Inc.
149 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal — Toronto — Vancouver



DECADE
OF OPERATION PROVES MAINTENANCE OF BUELL 'SF' PRECIPITATORS AVERAGE LESS THAN 2%

In 10 years of selling 'SF' electric precipitators, the number of replacement parts ordered from Buell has amounted to only 1.17% of the total sales! Even on emitting electrodes, usually the most vulnerable part of a precipitator, replacement has amounted to less than 1% of the original number installed. What do these extremely low percentages mean? Exceptionally low maintenance costs, for one thing, continuous high-efficiency operation, fewer shutdowns and process interruptions. Buell self-tensioned emitting Spiralectrodes eliminate vibration found in weight-tensioned wires. Buell's low maintenance precipitators will provide you with the most satisfactory operating results. They're backed by 25 years of experience in dust collection, with the practical know-how gained on hundreds of installations. Write for descriptive literature. The Buell Engineering Co., Inc., Dept. 42-A, 123 William St., N. Y. 38, N. Y. (Subsidiary: Ambuco Ltd, London, England)

EXPERTS AT DELIVERING EXTRA EFFICIENCY IN DUST RECOVERY SYSTEMS

buell®

MEETINGS

(Continued from P. 15)

Calif. Association headquarters, 29 Broadway, New York 6, N. Y.

American Institute of Electrical Engineers—Winter general meeting, Jan. 31-Feb. 5, Hotel Statler, New York. Institute headquarters, 33 W. 39th St., New York 18, N. Y.

FEBRUARY

American Society for Testing Materials—Committee Week, Feb. 1-5, Sherman Hotel, Chicago. Society headquarters, 1916 Race St., Philadelphia 3, Pa.

Alloy Casting Institute—Mid-winter management meeting, Feb. 4-5, Key Biscayne Hotel, Biscayne, Fla. Institute headquarters, 1001 Franklin Ave., Garden City, N. Y.

American Coke & Coal Chemicals Institute—Western regional meeting, Feb. 4, The Drake Hotel, Chicago. Institute headquarters, 711 14th St., N. W., Washington, D. C.

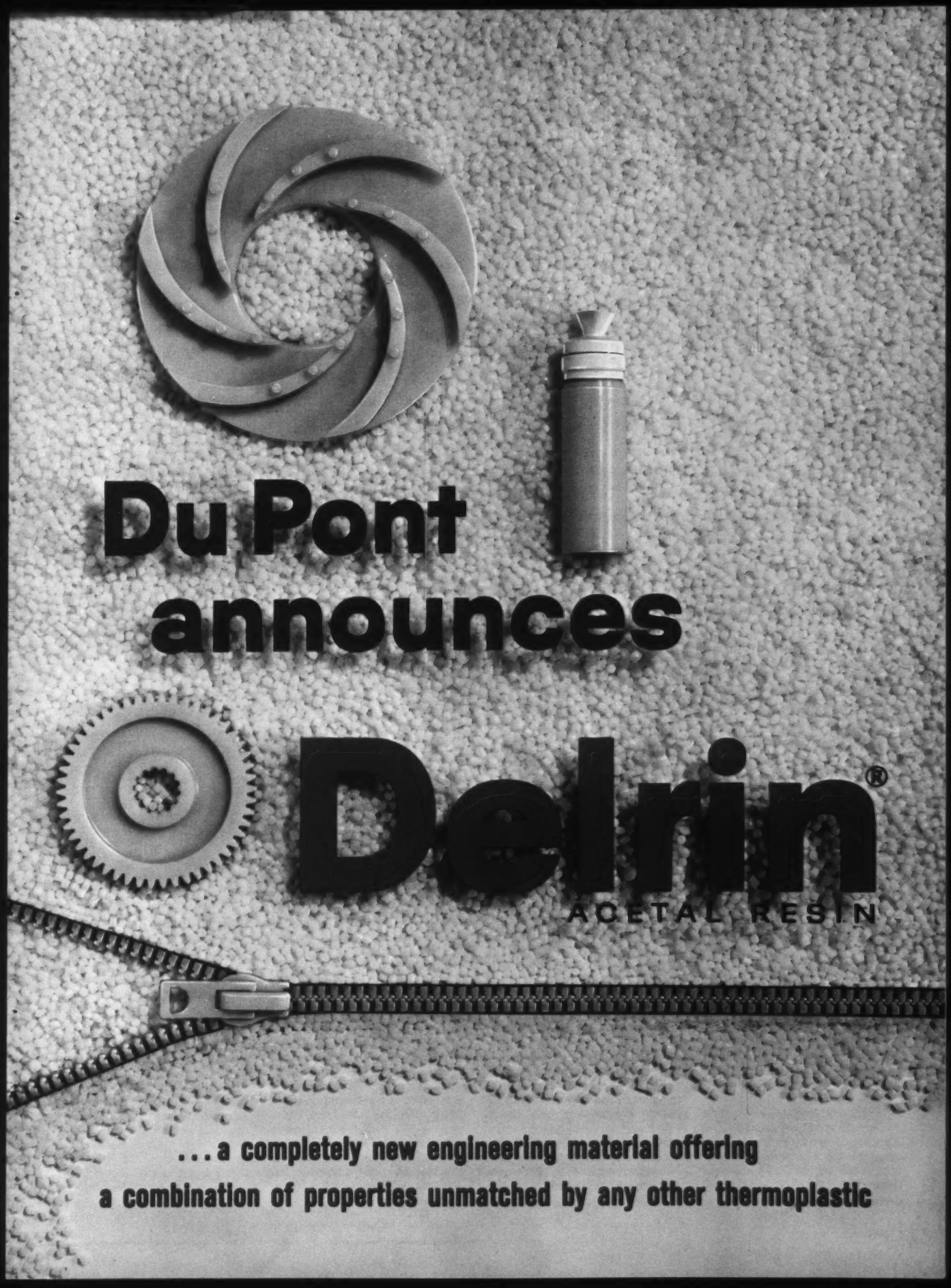
Society for Non-Destructive Testing—Symposium on Aircraft Components, Feb. 16-18, San Antonio, Texas. Society headquarters, 1109 Hinman St., Evanston, Ill.

American Institute of Chemical Engineers—National meeting, Feb. 21-24, Biltmore Hotel, Atlanta, Ga. Institute headquarters, 25 W. 45th St., New York.

Industrial Diamond Assn. of America, Inc.—Annual meeting and convention, Feb. 22-25, Hollywood Beach Hotel, Hollywood Beach, Fla. Association headquarters, Box 175 Pompton Plains, N. J.

MARCH

Hoist Manufacturers Assn. — Annual meeting, Mar. 1, Hotel Cleveland, Cleveland. Association headquarters, One Thomas Circle, Washington, D. C.


Du Pont
announces
Delrin®
ACETAL RESIN
...a completely new engineering material offering
a combination of properties unmatched by any other thermoplastic

This is Du Pont Delrin®:

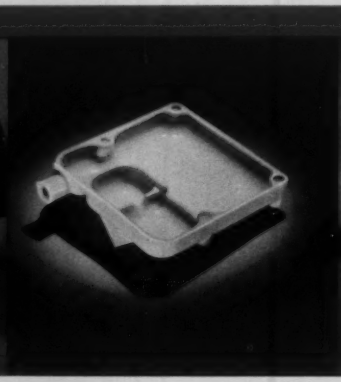
"Delrin" acetal resin is a highly crystalline, stable form of polymerized formaldehyde. This completely new material offers you metal-like mechanical properties, such as a high degree of strength and rigidity, plus other properties that metals do not possess.

The combination of properties offered by "Delrin" is unequaled by any other thermoplastic. For example, "Delrin" has high dimensional stability, tensile and flexural strength, resilience and toughness. Most importantly, "Delrin" retains these desirable properties under a wide range of service conditions—temperature, humidity, solvents and stress.

Over the past three years, "Delrin" has been

Typical performance and production advantages of "Delrin"

A brass part in a commercial flush valve was duplicated in "Delrin". This part operated perfectly for 18 months—the period of test—although it was completely and continuously immersed in water. The outstanding dimensional stability of "Delrin" under a wide variety of service conditions has also been proved, for example, in showerheads (continuously running water at 150°F.), and movie projector gears (run over 2,000 hours at ambient humidity).



This textile solution pan is ordinarily made of stainless steel. It must have resistance to oils and organic solvents, a clean, smooth surface; it also requires several threaded inserts plus other details. In normal quantities, stainless steel pans cost approximately $25 each. Injection molded in "Delrin", the cost was quoted at about $3 each. Testing showed that "Delrin" provided the required finish without machining, the needed solvent resistance, plus a weight saving of 75%.

A zinc die-casting mold was used to make this instrument cluster of "Delrin". Weight was reduced over the zinc component by almost 80%. In addition to manufacturing economies, further savings in assembly are indicated: self-tapping screws can be used, since the creep resistance of "Delrin" prevents loosening or stripping. These clusters can be molded in integral color or painted, and with a conventional mold would require little, if any, mechanical finishing.

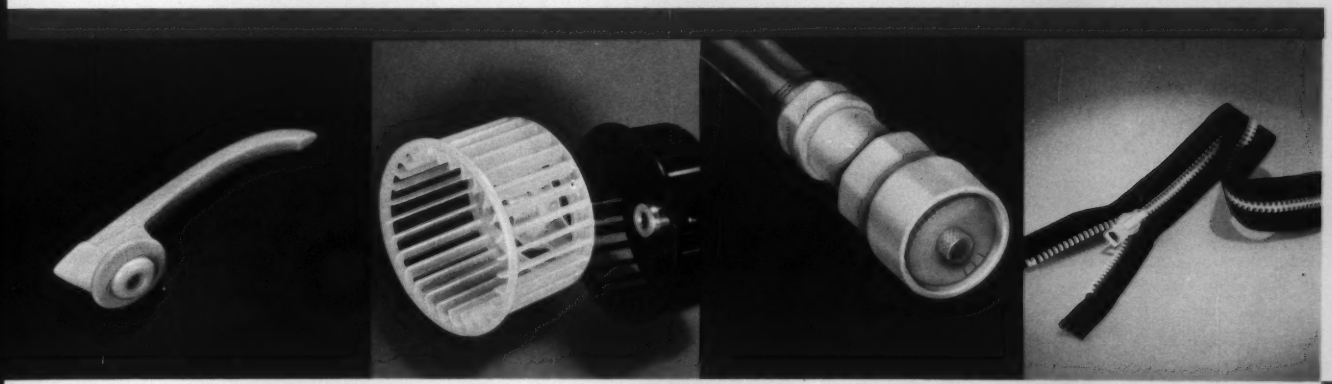
Aerosol containers made of "Delrin" were shelf-stored for over a year; others stored for 3 months at 130°F. In both cases, the contents were still completely dischargeable. "Delrin" retains its strength and toughness for long periods, even when exposed to elevated temperatures and organic solvents. Equally important are the new opportunities for high styling opened by "Delrin"—the freedom to design in new shapes and integral colors to suit purchasing trends.

tested in hundreds of end-use applications by a host of industrial concerns. These tests have confirmed that parts made of "Delrin" can compete *on a performance and cost basis* with parts made of many metals, rubber, glass or wood. Of the various end-uses tested, 75% would normally be made of metal and another 10% of rubber, glass or wood. These tests have resulted in many applications of "Delrin" now being readied for commercial production—including gears, bearings, housings, containers, plumbing and hardware parts, pump impellers, "squirrel-cage" blowers, door handles, clothing fitments and many others.

In addition to metal-like performance, "Delrin" offers you the manufacturing economies inherent in the production methods of the plastics industry. "Delrin" is easily injection molded, extruded, blow-molded or fabricated with conventional machine tools.

Illustrated below are a few of the applications of "Delrin" which have undergone extensive field service tests. The performance and economies listed were indicated during comparative evaluations made with materials in use at the time of the tests. These applications, together with additional data on the following page, may well suggest ways in which this versatile new engineering material can help *you* improve a product, lower its cost or develop new designs for your profit. Your inquiry is invited (see coupon on next page).

evaluated during three years of field tests . . .



Accessories usually made of metal, such as automotive window cranks and refrigerator door handles, can be economically mass-produced in "Delrin" by injection molding. "Delrin" provides required strength and rigidity. Integral colors, a variety of surface effects and functional details can be produced in one operation. Less weight, improved styling, dependable performance and potential cost savings are made possible by "Delrin".

Industrial components such as this "squirrel-cage" blower—as well as a variety of gears, bearings and other mechanical parts—have demonstrated the ability of "Delrin" to compete with various metals on a performance and cost basis. "Delrin" offers excellent fatigue life even when immersed in oil or water. Rapid production of lightweight, intricate components by the injection molding process can lead to substantial manufacturing economies with "Delrin".

Plumbing fixtures made of "Delrin", such as this showerhead, offer the manufacturer new styling and design advantages . . . and the home owner new latitudes in bathroom décor. Injection molded in integral color, fixtures made of "Delrin" assure builders and home owners of long-term dimensional stability, freedom from rust and mineral build-up. Modern in design, they are durable and dependable in service, and provide opportunities for potential cost savings.

Clothing fitments, such as zippers, clasps and snaps, are also readily and economically molded in "Delrin". Stiffness, toughness and resistance to heat, body oils and perspiration make "Delrin" a logical choice for such uses. Your customers would welcome the light weight, colorability and warm-to-the-touch benefits "Delrin" offers. Extensive field tests have demonstrated that "Delrin" is one of the most promising new materials available to the fitments industry.

TYPICAL PROPERTIES OF "DELRIN" ACETAL RESIN

			500X	150X
Elongation	—68°F.	D638	13%	38%
	73°F.	D638	15%	75%
	158°F.	D638	330%	460%
Impact strength, Izod	—40°F.	D256	1.2 ft.lb./in.	1.8 ft.lb./in.
	73°F.	D256	1.4 ft.lb./in.	2.3 ft.lb./in.
Tensile strength and yield point,	—68°F.	D638	14,700 psi	
	73°F.	D638	10,000 psi	
	158°F.	D638	7,500 psi	
Compressive stress at 1% deformation		D695	5,200 psi	
at 10% deformation			18,000 psi	
Flexural modulus,	73°F.	D790	410,000 psi	
	170°F.	D790	190,000 psi	
	250°F.	D790	90,000 psi	
100% RH 73°F.		D790	360,000 psi	
Flexural strength		D790	14,100 psi	
Sheer strength		D732	9,510 psi	
Heat distortion temperature,	264 psi	D648	212°F.	
	66 psi	D648	338°F.	
Fatigue endurance limit, 50 to 100% RH 70°F.			5,000 psi	
100% RH 150°F.			3,000 psi	
Water absorption, 24 hours immersion		D570	0.12%	
equilibrium, 50% RH		D570	0.2%	
equilibrium, immersion, 77°F.			0.9%	
Specific gravity		D792	1.425	
Rockwell hardness		D785	M94, R120	
Flammability		D635	1.1 in./min.	
Melting point (crystalline)			347°F.	
Flow temperature		D569	363°F.	

Deformation under load (2,000 psi at 122°F.)	D621	0.5%
Coefficient of linear thermal expansion	D696	4.5×10^{-5} per °F.
Taber abrasion (1000 gm. load, CS-17 wheel)	D1044	20 mg/1000 cycles
Thermal conductivity		1.6 BTU/hr./sq. ft./°F./in.
Specific heat		0.35 BTU/lb./°F.
Modulus of rigidity		178,000 psi
Poisson's ratio		0.35
Dielectric constant, 73°F., 10^2-10^5 cps	D150	3.7
Dissipation factor, 73°F., 10^2-10^5 cps	D150	.004
Dielectric strength, short time	D149	500 V/mil
Volume resistivity	D257	6×10^{14} ohm/cm
Resistivity	D257	2×10^{13} ohm
Arc resistance	D495	129 seconds (burns)

		P Factor at 73° F.:	
Permeability:	*Water*	1.9	gms loss/24 hrs/100 in^2 area/mil thickness. Determined on bottles with 35-50 mil wall thickness.
	Ethanol	0.2	
	Freon® 12-114 (20/80)	< 0.2	
	Methyl Salicylate	0.3	

		Room Temp.	122° F.	
Resistance to Organics:	CCl_4	1.2	5.7	% wgt. gain—12 mo. total immersion Vol. change proportional to wgt. change.
	Toluene	2.6	2.8	
	Acetone	4.9	2.6	
	Alcohol	2.2	1.9	
	Ethyl Acetate	2.7	2.9	

*These values are representative of those obtained under standard ASTM conditions and should not be used to design parts which function under different conditions. Since they are average values, they should not be used as minimums for material specifications.

DELRIN® ACETAL RESIN *offers design engineers a new combination of properties*

"Delrin" acetal resin offers you a combination of properties and potential cost advantages never before offered by any single material. Specific values of typical properties of "Delrin" are listed in the table above . . . and the advantages implicit in these figures have been thoroughly tested in a wide variety of end-uses.

Today is your best opportunity to consider how Du Pont "Delrin" can help you improve the design of a product or develop your designs on new products. Within the next few weeks a new plant to manufacture "Delrin" in commercial quantities will come on stream at Parkersburg, W. Va. This plant is your assurance that your design improvements can fast become practical realities. Commercial molders, already familiar with "Delrin", can provide you with valuable assistance in your problem.

A specialized group of Du Pont engineers, as well, can help you with their experience and knowledge gained during years of market development work with "Delrin". They may well have tested the very product or component you are considering.

FOR MORE SPECIFIC INFORMATION MAIL THIS COUPON

E. I. du Pont de Nemours & Co. (Inc.), Advertising Department
Nemours Building, Rm. 99D, Wilmington 98, Delaware

I am interested in evaluating "Delrin" for the following use:_____

NAME

COMPANY POSITION

STREET

CITY STATE

In Canada: Du Pont of Canada Limited, P.O. Box 660, Montreal, Quebec.

DELRIN®
ACETAL RESIN

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

"We found a way to get complete inventory turnover in 60 days,"

says Mr. Robert W. Boldt, Purchasing Agent, Borg-Warner Industrial Cranes, Ingersoll Products Division, Borg-Warner Corporation, Chicago, Illinois
Manufacturers of overhead, gantry and jib cranes.

"Our cranes are designed and engineered to fit the duty cycle of a particular job," says Mr. Boldt. "We buy material on a tailor-made basis, because we can't anticipate our needs. We maintain the smallest possible inventory and concentrate our purchases on a day-to-day basis.

"U.S. Steel Supply has helped us reach a high degree of production efficiency in our existing plant area. We've reduced capital investment and eliminated a lot of scrap loss. We get fast replacement of off-standard specifications. We've slashed inventories and brought our goal for a 60-day inventory turnover within range."

Do you have an inventory problem? A scrap problem? A production problem? Perhaps U.S. Steel Supply's new and helpful booklet entitled "How To Subtract Hidden Inventory Costs" can help you solve it. Write to our Chicago Office, or call your nearest U.S. Steel Supply Steel Service Center. You'll find us in the Yellow Pages listed under *Steel*.

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Division of
United States Steel

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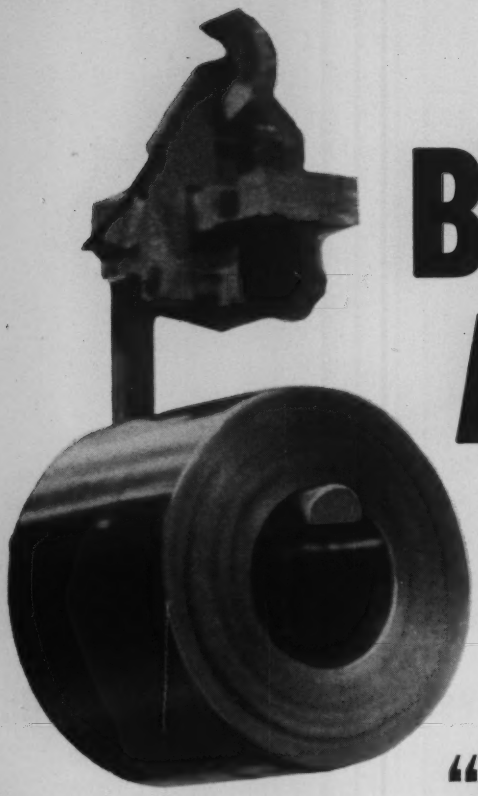


BRIDGEPORT ALUMINUM SHEET

GIVES YOU "COST-SAVING EXTRAS"

Now you can order quality aluminum coiled or flat sheet from Bridgeport's warehouse stocks. It's available in a wide range of common commercial alloys (non-heat-treatable) up to 24" wide in most finishes. Bridgeport's modern production equipment and techniques, based on long experience, turn out products that can be relied upon for "cost-saving extras."

EXTRA UNIFORMITY of gauge and tolerances eliminates numerous time-consuming press adjustments . . . assures longer tool life. You get extra quality in every square inch of your Bridgeport Aluminum sheet.

EXTRA FINE FINISH, a "must" at Bridgeport, gives your product additional "selling appearance."

EXTRA LONG COILS for cost-saving special applications—ideal for fin stock, etc. Continuous unspliced coils within mill limits may be obtained which are well over three miles in length.

EXTRA SERVICE includes not only delivery of precisely what you specify on the dates agreed upon, but custom slitting as well. Top technical service is a well-known Bridgeport specialty.

BRASS Bridgeport CO.

BRIDGEPORT BRASS COMPANY

Bridgeport 2, Connecticut

Specialists in Metals from Aluminum to Zirconium

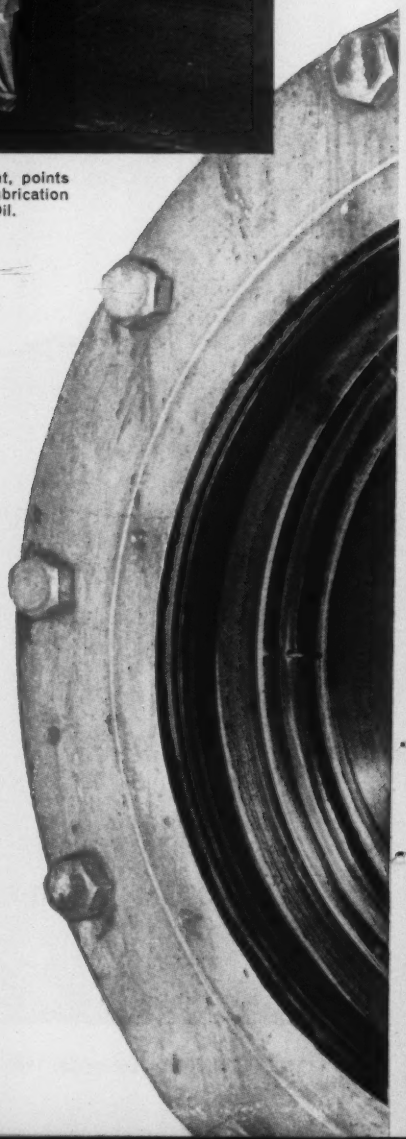
Bridgeport Warehouses Located At: CHICAGO: LAfayette 3-2230 • CLEVELAND: CEdar 1-5180 DENVER: CHerry 4-3308 • ST. LOUIS: CEntral 1-0076 • DALLAS: RIverside 1-4859 • LOS ANGELES: RAymond 3-5101 • HILLSIDE: BIgelow 3-0044 • NEW YORK: EXeter 2-4290 • PHILADELPHIA: JEfferson 5-3900 • PROVIDENCE: WIlliams 1-2100 • SAN FRANCISCO: UNderhill 1-2551

Write Department 2301 for this free Warehouse Stock List.

PERFORMANCE REPORT

R. J. Huff, Granite City maintenance superintendent, points out Morgoil bearings to J. H. Koester, Granite City lubrication engineer, and W. P. "Sandy" Wehking of Standard Oil.

How *STANOIL Industrial Oil has been delivering on 22-year assignment at Granite City Steel*



Bearing assembly viewed from inside by J. H. Koester and Sandy Wehking. Sandy Wehking knows industrial lubrication. For 17 years he's been providing lubrication technical service to industrial customers. He studied chemistry at Blackburn College and has completed the Standard Oil Sales Engineering School.

Situation: In 1937, Granite City Steel installed STANOIL Industrial Oil in the Morgoil Back-up Roll Bearings in the five-stand finishing train of their hot strip mill. Each bearing has a load-carrying capacity of more than three million pounds. The oil on which these bearings ride must be of high quality to meet the requirements of this severe service. A narrow viscosity range is required to assure proper operation of the mill throughout the speed range. More than 10,000 gallons of water per minute are used to cool the work rolls. The oil thus must have superior demulsibility to prevent water contamination.

What has happened: Today approximately 1,800 tons rolled is the average shift production. A record of over 2,700 tons rolled has been racked up by one shift in this mill. STANOIL Industrial Oil has continued to deliver top operating performance under these increasingly demanding conditions. Samples of the oil are taken regularly by the Standard Oil lubrication specialist for laboratory analysis to make sure the oil is maintaining specifications. Stocks of STANOIL Industrial Oil are warehoused by Standard at East St. Louis, only twelve miles away, so that the mill has a ready source for the product whenever needed.

What you can do: Get all the facts about STANOIL Industrial Oil from the Standard Oil lubrication specialist near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

STANDARD

You expect more from Standard and you get it!

Which OXYGEN STEEL-MAKING

Higher quality, less costly steel is being produced today through a more effective use of oxygen in several new steel processes.

Which of the processes is best for *you?* Or are you considering oxygen enrichment for existing open hearths or blast furnaces?

For your oxygen requirements, American Messer's broad experience in the design and construction of bulk oxygen plants for steel mill applications is at your service.

Messer can work with you to install an oxygen system properly tailored to your own requirements—to make sure your operation is the one ideally suited to increase tonnage and improve the quality of your production.

With seven tonnage oxygen plants now serving the steel industry and two currently under construction, *you* can profit from Messer's oxygen know-how in the modernization of your steel facilities. Write or call American Messer today for full information.

AMERICAN MESSER

CHRYSLER BUILDING • 405 LEXINGTON AVENUE

PROCESSES Are You Considering?

WHATEVER
YOUR CHOICE—
CONSULT
MESSER FOR
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SYSTEMS

Messer

CORPORATION

NEW YORK 17, NEW YORK

Remember CLAYMONT

TO fabricators and equipment manufacturers, the Image of CF&I means single-source service for many of their steel plate requirements. This giant steelman reflects the integrated steel production and plate fabricating facilities of CF&I's Claymont, Delaware plant.

Claymont makes its own steel, rolls its own plate and performs every plate-fabricating operation, exercising step-by-step quality controls within the Claymont plant. Consequently, steel plate availability is no problem, and customer specifications are met exactly.

Small or large-quantity orders are handled with equal facility. Quick shipments from stocks are available on many items, and delivery promises are kept on special-to-order production.

Whether you need an added source or want a single source for steel plates and steel plate products, contact Claymont. Full details and prompt service are available through any CF&I sales office—and there's one near you.

for steel plates... heads... fabricated plate products

Claymont Steel Plates

CARBON—to all standard ASTM and AISI specifications.

ALLOY—including nickel-bearing ASTM specifications A-203 and A-353 for liquid oxygen storage and other low temperature applications . . . "chrome-moly" ASTM specification A-387 (all grades) for high temperature and high pressure applications . . . as well as ASTM specifications A-202, A-204, A-225, A-302 and AISI specifications 4140 and 4130.

STAINLESS-CLAD—provides the same protection against corrosion, abrasion and contamination as solid stainless—*plus* the economy of carbon steel backing plates. Cladding and backing are inseparably bonded together. Claddings are available in thicknesses from 5% to 50% of total plate gage. AISI stainless specifications 304, 304L, 316, 316L, 316Cb, 321, 347, 405, 410, 430 are provided. ASTM A-263 and A-264 specifications can be supplied also.

CLAY-LOY high strength low alloy steel plates—comply with ASTM specification A-242. Ideal for structural and equipment applications where weight-saving is important.

CF&I LECTRO-CLAD nickel plated steel plates—give positive protection against product contamination and discoloration, at less cost than solid nickel.

Claymont Spun and Pressed Heads

Claymont has complete facilities to produce spun or pressed heads . . . in diameters from 9 inches to 19 feet . . . in gages from 3/16" to 6" . . . in the following shapes: standard or ASME flanged and dished, conical, hemispherical, elliptical, flanged and reverse dished, dished only, flared and dished, flanged and shallow dished, flanged only, and large segmented and welded shapes. Metals include carbon, alloy, stainless or stainless-clad steels; aluminum, aluminum alloy, brass, bronze, copper, Hastelloy, inconel, monel, and other ferrous and non-ferrous metals supplied by our customers.

Large stocks of the more popular sizes of Claymont Heads, flanged and dished in carbon steels, are maintained at the following CF&I warehouses:

Chicago • Claymont, Delaware • Houston • Los Angeles
San Leandro, California • Tulsa

Claymont also manufactures a complete line of fittings for pressure vessels, such as manhole and handhole fittings, elliptical manhole rings and storage tank manhole frames and covers.

Claymont Fabricated Steel Plate Products

Claymont's production-line fabrications shop is completely equipped to convert the steel plate of your choice into completely-fabricated assemblies or simple, single-operation parts or components. Job-shop facilities of all kinds are available to furnish welded, rolled, sheared, flame-cut, pressed, punched or machined products to exacting specifications. Claymont's fabricated structural weldments range from 120-ton fully-welded sections to such items as bearing assemblies, base and tie plates, wedges, gussets and straps.

Use Claymont's complete plate fabrications facilities as an extension of your own shop. Have difficult, time-consuming operations performed *before* the steel plate is delivered, and save shipping and handling on the part of the plate that you can't use.

If you use any of the steel plate products listed above, or large diameter API Pipe, contact the nearest CF&I sales office.

Claymont Steel Products

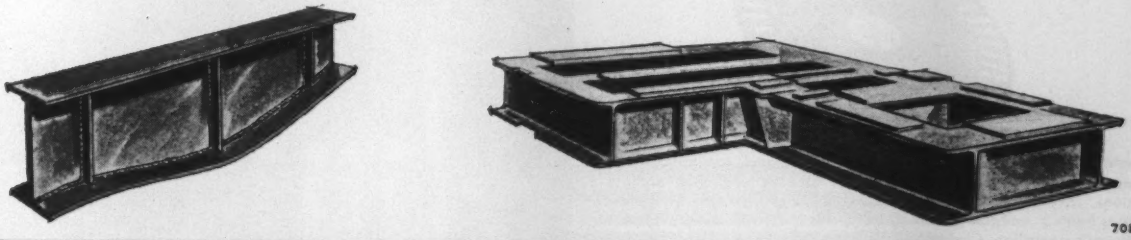
THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa • Oklahoma City • Phoenix Portland (Ore.) • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg



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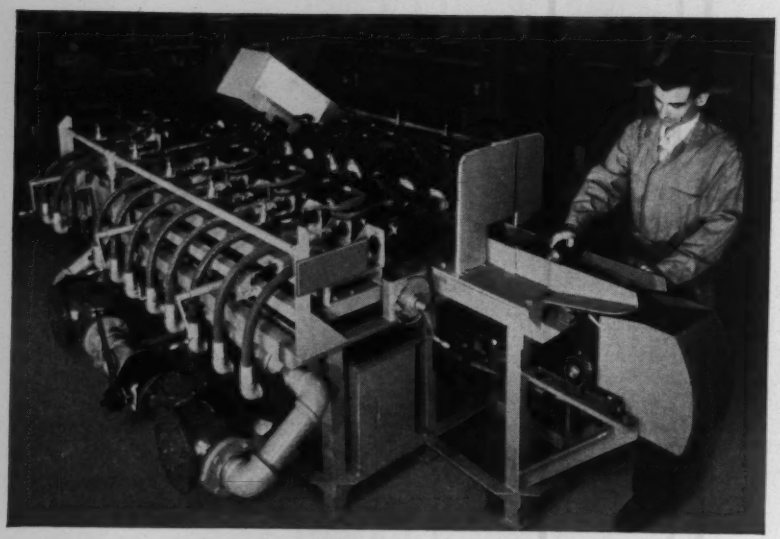
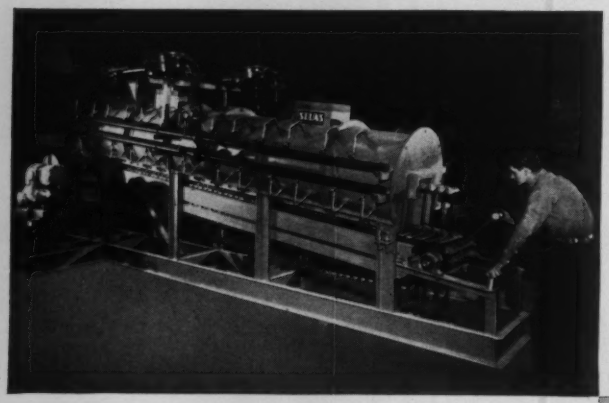
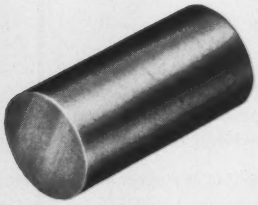


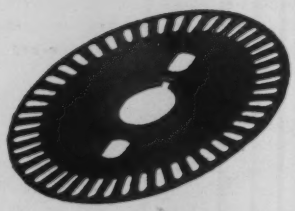
SELECTIVE HARDENING: Both faces of sledge-hammer-heads are selectively hardened and tempered in a continuous operation. Tempering, previously requiring hours, now performed in minutes. Machine handles wide variety of sizes, shapes and widths of heads. Integration with preceding grinding step enables operation of machine with no additional labor.

Here's How Industry Cuts Costs

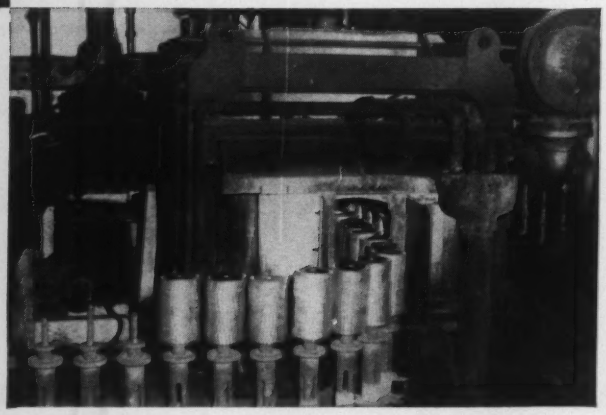




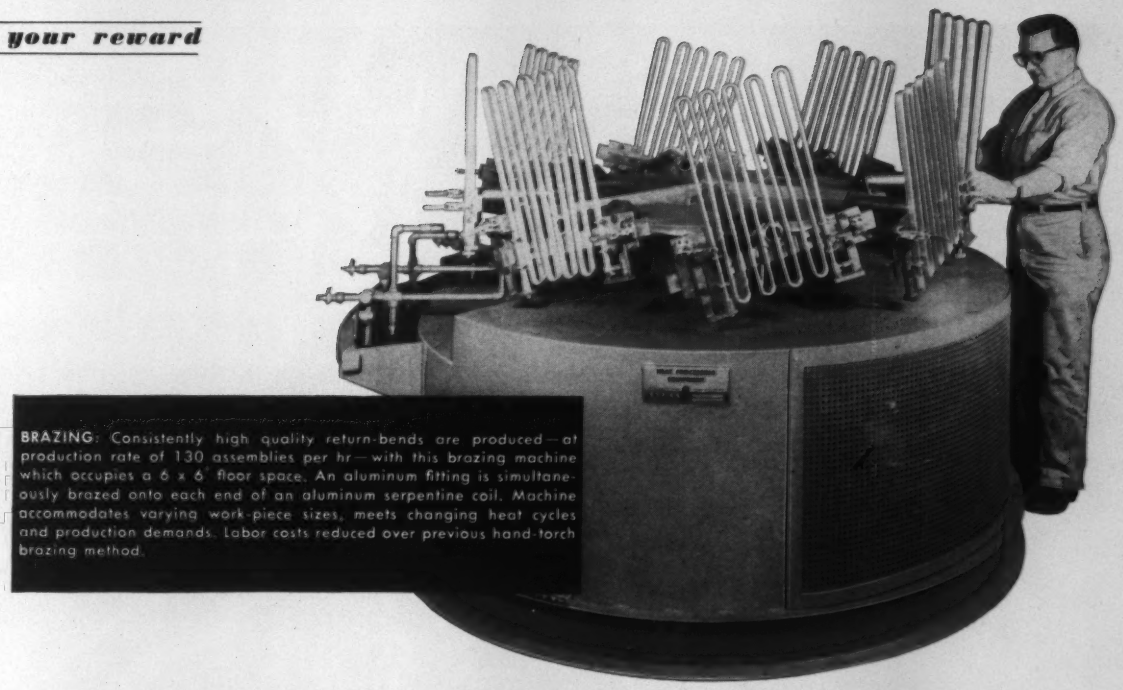
HEATING FOR FORGING: Brass slugs—⅞ to 2" diam., 2½ to 8" long—are heated to 1390°F in this automatic machine at high production rates. Selas fast, uniform heating produces fine grain size, improved physical properties.



ANNEALING: Electric motor stator and rotor laminations are annealed to develop required electrical characteristics. Laminations, 2½" to 10" O.D., stacked 6" high on spindle fixtures, are heated uniformly and quickly, then control-cooled, in continuous operation. Complete cycle takes only 35 min, increases production rates substantially over conventional methods.



is your reward



BRAZING: Consistently high quality return-bends are produced—at production rate of 130 assemblies per hr—with this brazing machine which occupies a 6 x 6' floor space. An aluminum fitting is simultaneously brazed onto each end of an aluminum serpentine coil. Machine accommodates varying work-piece sizes, meets changing heat cycles and production demands. Labor costs reduced over previous hand-torch brazing method.

...Improves Product Quality

with SELAS heat processing equipment

The installations on these pages demonstrate how Selas automatic heat processing equipment

- cuts operating costs
- increases production rates
- minimizes in-process inventory
- reduces labor requirements
- saves valuable floor space
- improves product quality

Specifically designed and custom-built to meet your individual production requirements and job specifications, Selas heat processing equipment employs time-proven standardized engineering features for longtime operating dependability and minimum initial investment. Problems usually associated with divided responsibility are avoided since Selas starts-up and services every machine it designs and builds.

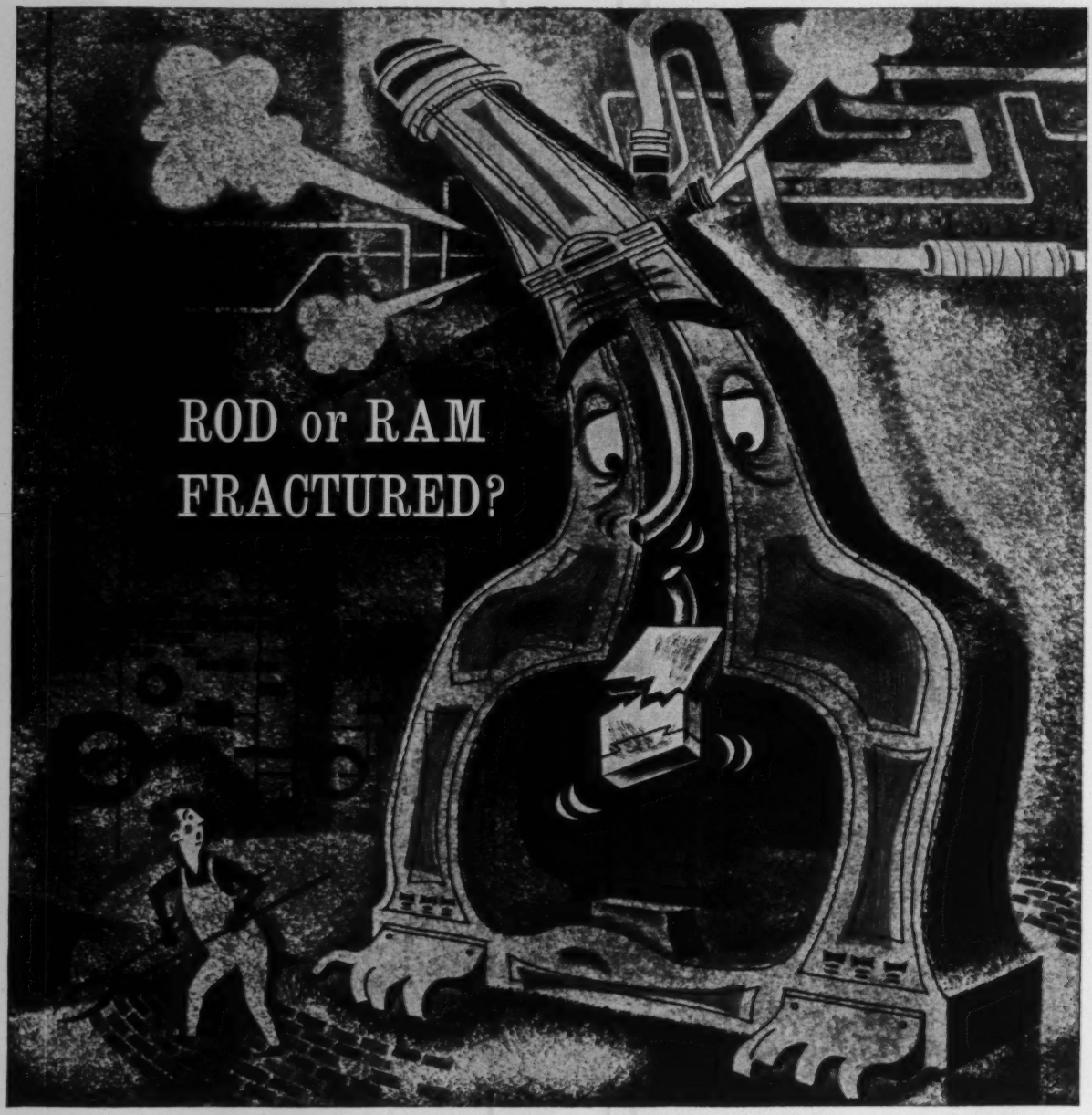
Selas automatic or semi-automatic heat processing equipment can help you produce better products at lower costs. At your convenience—without obligation to you—a Selas field engineer would welcome the opportunity to survey your requirements.

For this free, personal service, or for literature on any of the heating operations shown here, write Mr. W. B. Troupe, General Industry Div., Selas Corporation of America, 11 Dreshertown Road, Dresher, Pa.

SUBSIDIARIES: Selas Constructors, Inc., Houston, Texas; Selas Corporation of America, European Div., S. A., Pregny, Geneva, Switzerland. **INTERNATIONAL REPRESENTATIVES AND LICENSEES:** CAMBODIA, FORMOSA, KOREA, LAOS, VIETNAM—Cosa Export Co., Inc.; AUSTRIA, GERMANY—Indugas, Essen; JAPAN—International Machine Co., Ltd., Tokyo; ITALY—Italiana Gasogeni E. Forni S.r.l., Milano; FRANCE—Societe Exploitation de Produits Industriels, Paris.

SELAS CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

HEAT AND FLUID PROCESSING ENGINEERS development · design · construction



Call ERIE FOUNDRY for forging hammer replacement parts to your specifications

Replacement rods and rams, and many other parts for a wide variety of forging hammers of most any make are available from Erie Foundry. They are high in quality, competitive in price.

For over 65 years Erie Foundry has specialized in the design, development and manufacture of forging hammers of all types. Logically, then, Erie Foundry is a sure source for repair parts equal in quality and performance to the original equipment. Substantial inventories assure you of prompt service.

For more information on repair parts or our complete Rebuilding Service, write Mr. James Walker.

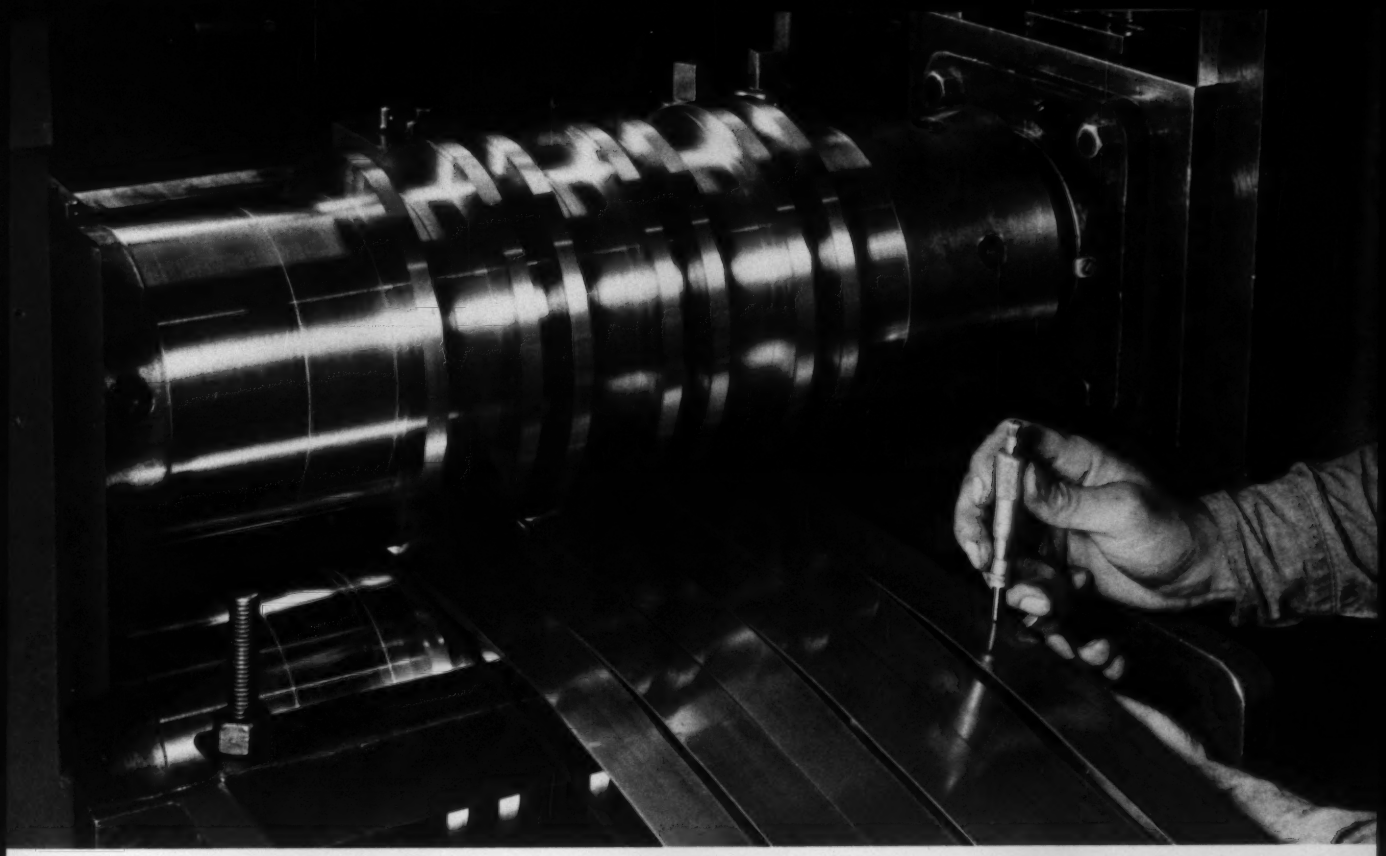
Manufacturers of Forging Hammers • Forging Presses • Hydraulic Presses • Trimming Presses

ERIE

ONE OF THE GREAT NAMES IN FORGING SINCE 1895

ERIE FOUNDRY CO., Erie, Pa.

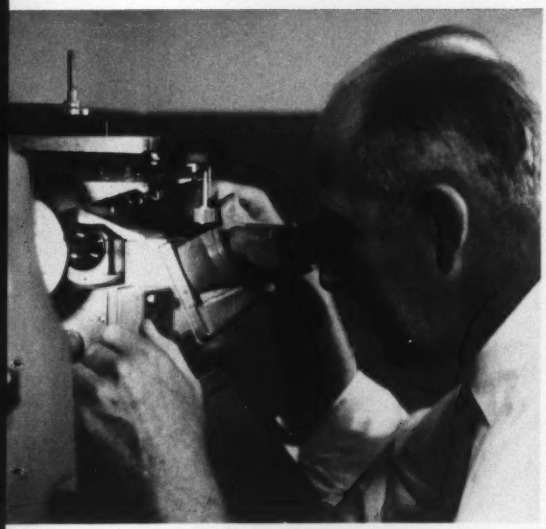
EF-60-01



PRECISION SLITTING of cold-rolled spring steel is made possible because of careful quality control at every step.

From Athenia Steel...

High-quality, high-carbon spring steel



METALLOGRAPH for determining metallurgical properties of steel plays important role in Athenia's precise stock selection.

For over 50 years, the Athenia Steel Division of National-Standard has been producing cold-rolled spring steel, specialized and alloy steel, and cold-rolled flat wire for hundreds of industrial applications requiring high-quality specialty steels. This outstanding quality is due to proper raw material selection, precise laboratory control through final processing, modern equipment and technical knowledge.

SPRING STEELS, cold-rolled annealed, are produced in thicknesses of .001″ to .065″, in widths from .015″ to 16″. Range of tempered spring steel is .001″ to .065″ thick, .015″ to 6.5″ wide, with the following finishes: Black or Scaleless, Polished Bright, Polished and Blued or Strawed. Athenia also produces narrow flat stainless steel and cobalt-base NILCOR®.

TECHNICAL HELP from Athenia engineers is available to determine the specific flatness, straightness, uniformity, temper, edge, finish or special feature you need. For engineering assistance, write to Athenia Steel with details of your requirements, or ask for the new brochure describing Athenia products, service and manufacturing facilities.

NS NATIONAL-STANDARD COMPANY

Athenia Steel Division

NATIONAL-STANDARD COMPANY

Clifton, New Jersey

NS SPECIAL WIRE KEEPS SPRINGS ALIVE IN 1400° BATH

When a leading manufacturer of microwave assemblies and radar components was faced with a serious production bottleneck in a high-temperature dip-brazing operation, they came to National-Standard for help in solving the problem.

CRITICAL MICROWAVE ASSEMBLIES being brazed in a 1400° salt bath were held together by cumbersome weights and intricate fixtures that frequently caused distortion or slippage during the brazing operation. The solution—and a considerable time and money saver—was to clamp all the components with springs that would allow expansion of the various parts during brazing without distorting the assembly. However, conventional spring wire would not retain tension at 1400°. Once used, springs had to be discarded.

NATIONAL-STANDARD ENGINEERS, working with the manufacturer's engineers, tested a new superalloy spring wire, NS-25 (L605), that proved "as good as new" after several hundred brazing operations at 1400° F. The mechanical stability of NS-25 spring wire insures proper expansion of parts during heating and maintains just the right tension to give mating parts good contact and perfect bond. The result is manufacturing that is simplified, faster and more precise than was previously possible.

EXPERIENCED ENGINEERING HELP of this kind, for jobs requiring high-quality wire, to meet special or unique applications, is available to you from National-Standard. Write for additional information to National-Standard Company, Niles, Michigan.

MICROWAVE ASSEMBLIES are held together in 1400° brazing bath by springs made of NS-25 wire. This special alloy wire allows rapid, precise brazing never before possible.

NS NATIONAL-STANDARD COMPANY

Manufacturer of Specialty Wire and Metal Products

NATIONAL-STANDARD COMPANY

Niles, Michigan

NATIONAL-STANDARD PLANTS ARE SERVICE-LOCATED NEAR YOU...

National-Standard Company is a specialized manufacturer of high-quality wire, wire cloth, flat spring steel and perforated metal. With manufacturing and warehousing facilities around the world, National-Standard is ideally organized to serve your special wire or metal products requirements. For fast delivery or experienced engineering services, contact the National-Standard plant or warehouse nearest you.

NATIONAL-STANDARD DIVISION

Music spring wire, stainless steel wire, super-alloy wire, plated wire, tire bead wire, flat and tubular braid.

Niles, Michigan
Akron, Ohio
Los Angeles, California

ATHENIA STEEL DIVISION

Cold rolled high carbon flat spring steel, tempered or annealed; alloy steel, high-carbon and stainless steel, flat wire

Clifton, New Jersey

REYNOLDS DIVISION

Wire Cloth Plant

Full range of weaves, metals, and coatings; specialty weaves

Dixon, Illinois

Cross Perforated Metals

Commercial, ornamental and industrial perforated metals

Carbondale, Pennsylvania

WORCESTER WIRE DIVISION

Fine high and low carbon wire, music spring wire, stainless steel wire, plated wire, other specialty wires.

Worcester, Mass.

WAGNER LITHO MACHINERY DIVISION

Metal decorating equipment

Secaucus, New Jersey

NATIONAL-STANDARD *plants are also located in Guelph, Ontario; Kidderminster, England; Port Elizabeth, South Africa; and Cologne, West Germany.*

WAREHOUSES

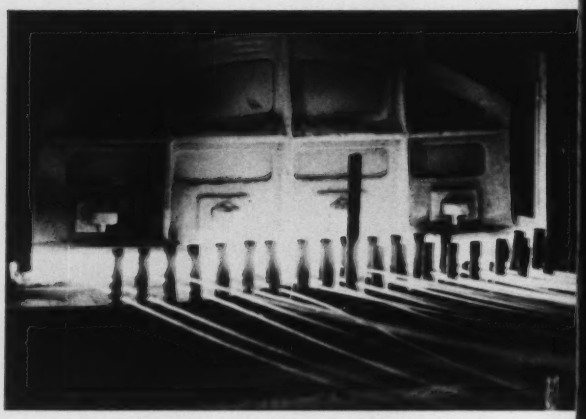
NATIONAL-STANDARD, ***Akron, Ohio***
Music Spring Wire, Stainless Steel Wire

NATIONAL-STANDARD, ***Plainville, Connecticut***
Music Spring Wire, Stainless Steel Wire

Other warehouse facilities are located in key industrial areas.

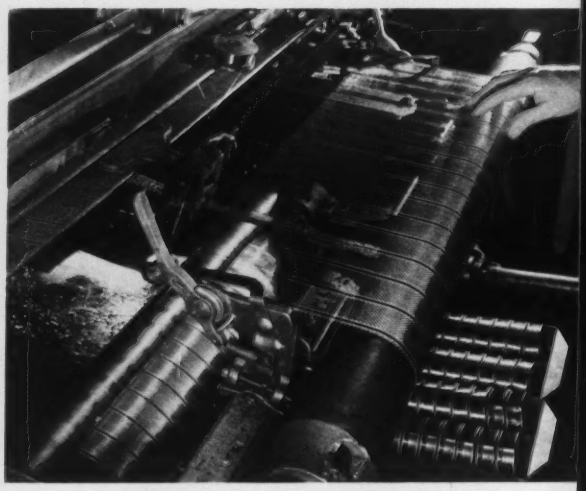
NS NATIONAL STANDARD COMPANY

NATIONAL-STANDARD COMPANY
Niles, Michigan

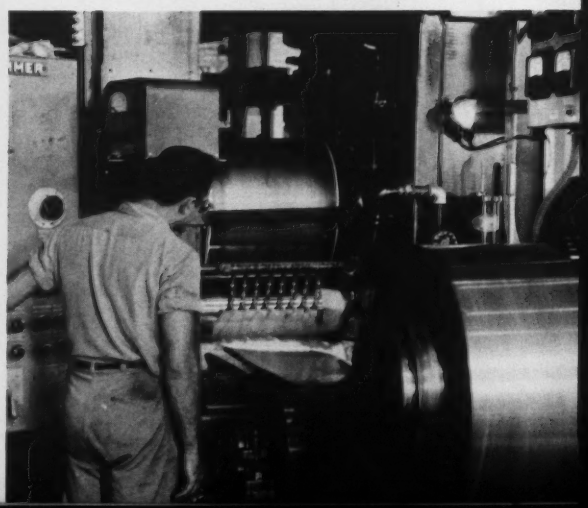


SPECIALTY WIRE of many types is produced by National-Standard and Worcester Wire plants, and stock is located near most major industrial areas.

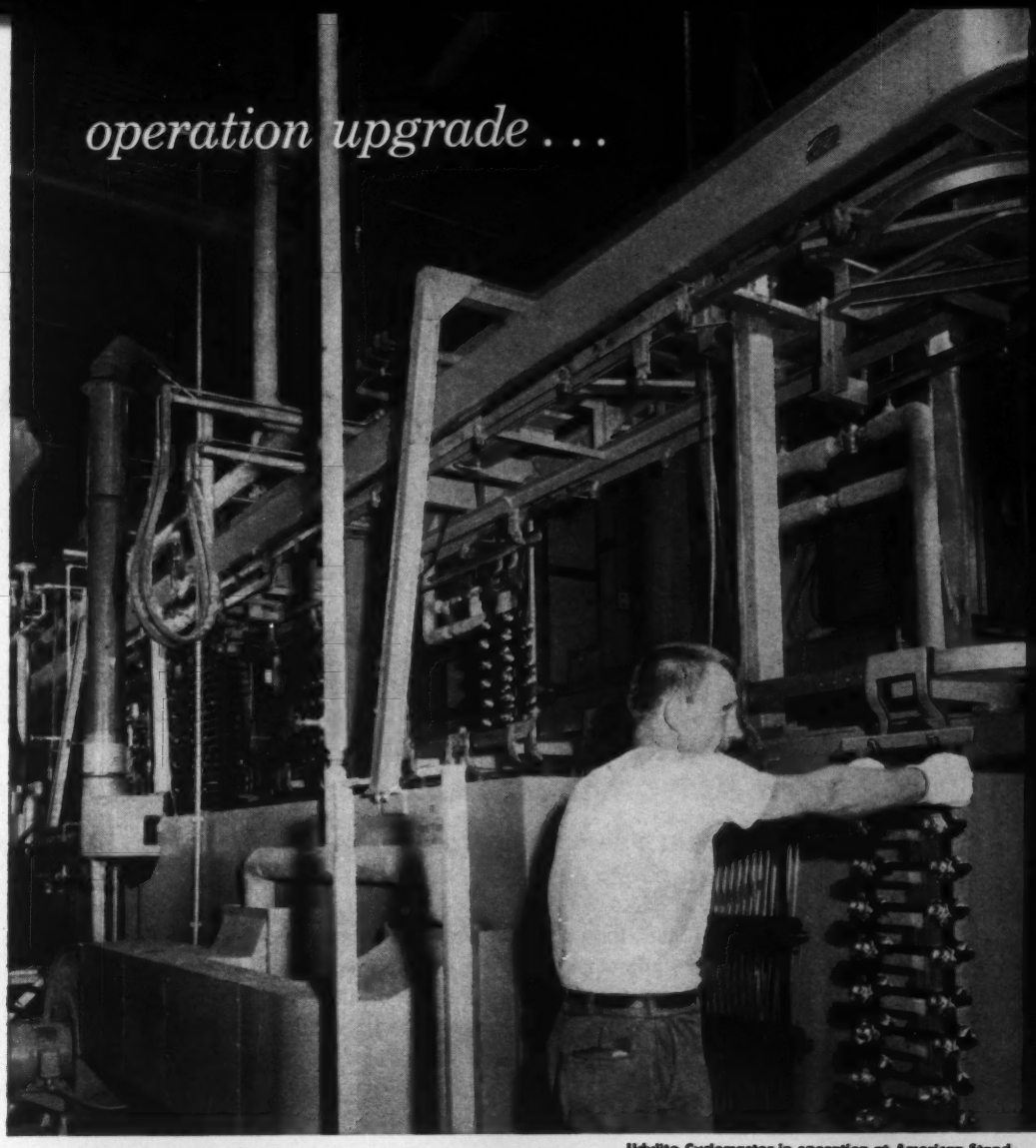
INDUSTRIAL WIRE CLOTH woven from variety of metals in wide selection of weaves by the Reynolds Division is employed in hundreds of filtering, straining, and reinforcing applications.



FLAT SPRING STEEL manufactured by Athenia Steel Division meets rigid specifications for high-carbon steel utilized in many products where quality and precise manufacturing controls are important.



operation upgrade . . .



Udylite Cyclemaster in operation at American Standard Plumbing and Heating Division, Cincinnati, Ohio

CYCLEMASTER has the answer . . .

This Udylite Cyclemaster, which is another way to say low cost automation, represents six important areas of improvement in American Standard's plating production.

- quality control to meet their most exacting top standards
- production volume far exceeding their expectations
- nearly 50% savings in floor space used for the operation
- almost total elimination of rejected pieces
- ultra-sonic cleaning to eliminate complicated de-greasing
- Plastisol coated tanks for minimum maintenance . . . long life

Learn how Cyclemaster can perform with equally promising revisions of your profit picture while improving your product whatever it may be. To find out how so *much* can be accomplished for so *little*, ask your Udylite representative, today!

the udylite corporation

detroit 11, michigan • world's largest plating supplier

on the west coast: the L. H. Butcher Company

the most DYNAMIC ATTRACTION

a show ever had!

at the 1960 PHILADELPHIA

42nd NATIONAL METAL CONGRESS & EXPOSITION

Philadelphia Trade and Convention Center • Oct. 17-21, 1960

EXHIBITORS FROM ELEVEN METALS AREAS

1. Ferrous Metal Producers and Distributors
2. Nonferrous Metal Producers and Distributors
3. Related Engineering Materials
4. Nuclear Materials and Equipment
5. Tool Materials, Cutting-Off and Forming Equipment
6. Industrial Heating Equipment and Supplies
7. Cleaning and Finishing Equipment and Supplies
8. Welding and Joining Equipment and Supplies
9. Testing, Inspection and Control Equipment and Supplies
10. Production and Casting Equipment and Supplies
11. Parts, Forms and Shapes for Design and Applications

Exhibitors at the Philadelphia Metal Show will gather their customers and prospects from the broad metalworking industry, including automotive, aircraft, appliance, ordnance, farm machinery, electrical machinery, instruments, and miscellaneous metalworking manufacturers . . . creating a thriving, effective, profitable marketplace. If your potential for sales lies in any of these areas, the Metal Show should take priority in your sales plan for maximum impact in the Soaring Sixties.

Floor Plan Folders are now available — for complete information, consult the ASM representative nearest to you, or write direct.

NEW YORK — OXford 7-2667
CLEVELAND — JOrdan 4-2271 (Novelty, Ohio)
CHICAGO — WAbash 2-7822

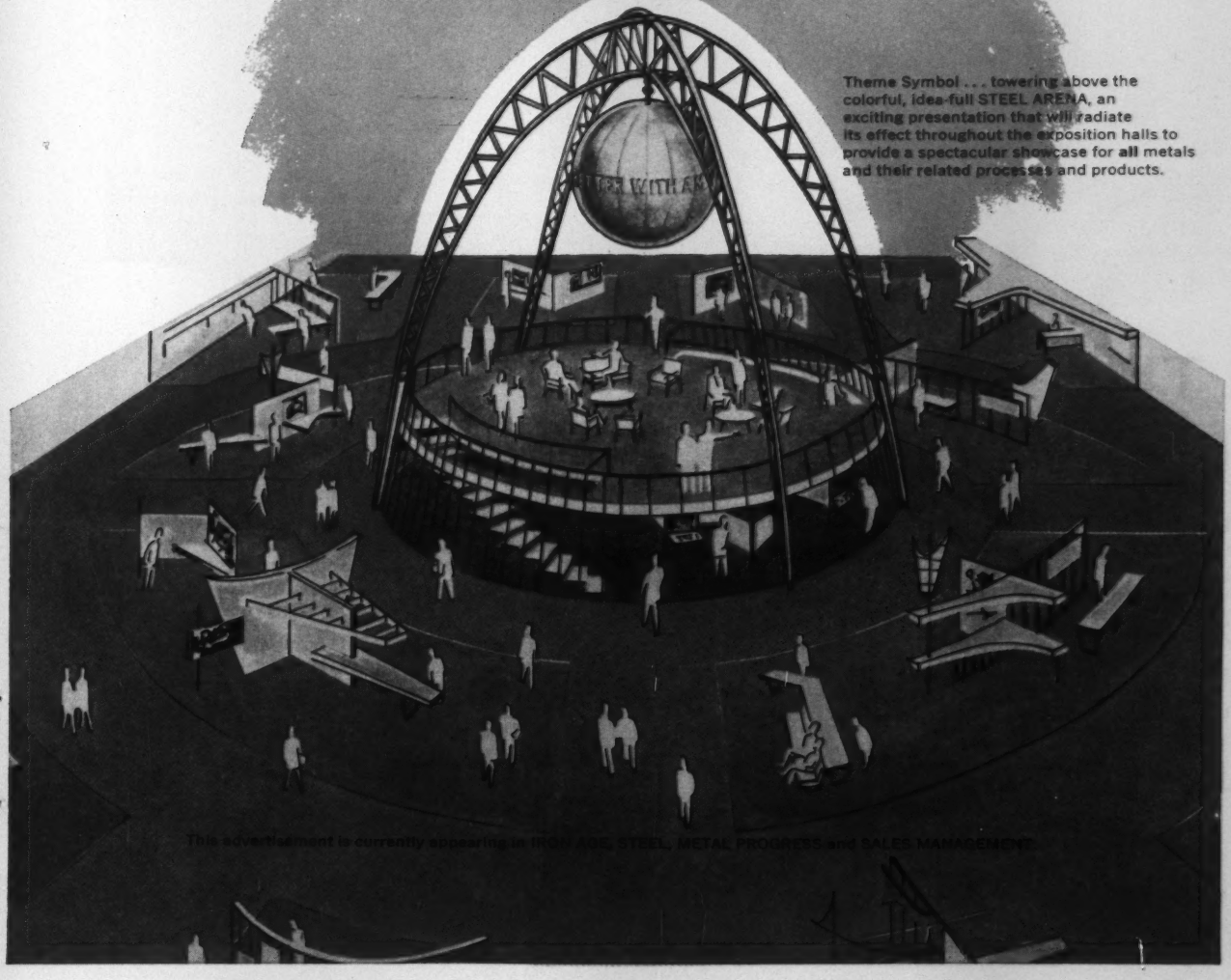
Steel, the sinew that binds the strength of America, will serve as a magnetic attraction to call attention to **every** area of metals technology, ferrous and nonferrous, at the most metallic of all Metal Shows — the 1960 Philadelphia Metal Show, now blue-printed and ready to grow into its full dimensions. This new emphasis on the essential metals of industry reflects a growing specialization . . . a **focusing** of attention . . . to yield a greater benefit. In the evolution of the Metal Show, the time for such refinement has come. Now it is possible to achieve a concentration on **materials** that is unsurpassed anywhere for an intensive person-to-person interchange of information. The STEEL ARENA is the threshold to a whole new world of metals within the exhibits and technical sessions. The pre-eminence of a Metal Show of these dimensions is worth your closest consideration as an exhibitor — you are invited to share its benefit in any of the eleven areas of metals listed.

MAKE PLANS NOW
TO EXHIBIT AT THIS GREATEST OF ALL METAL SHOWS!

AMERICAN SOCIETY FOR METALS
Metals Park • Novelty, Ohio

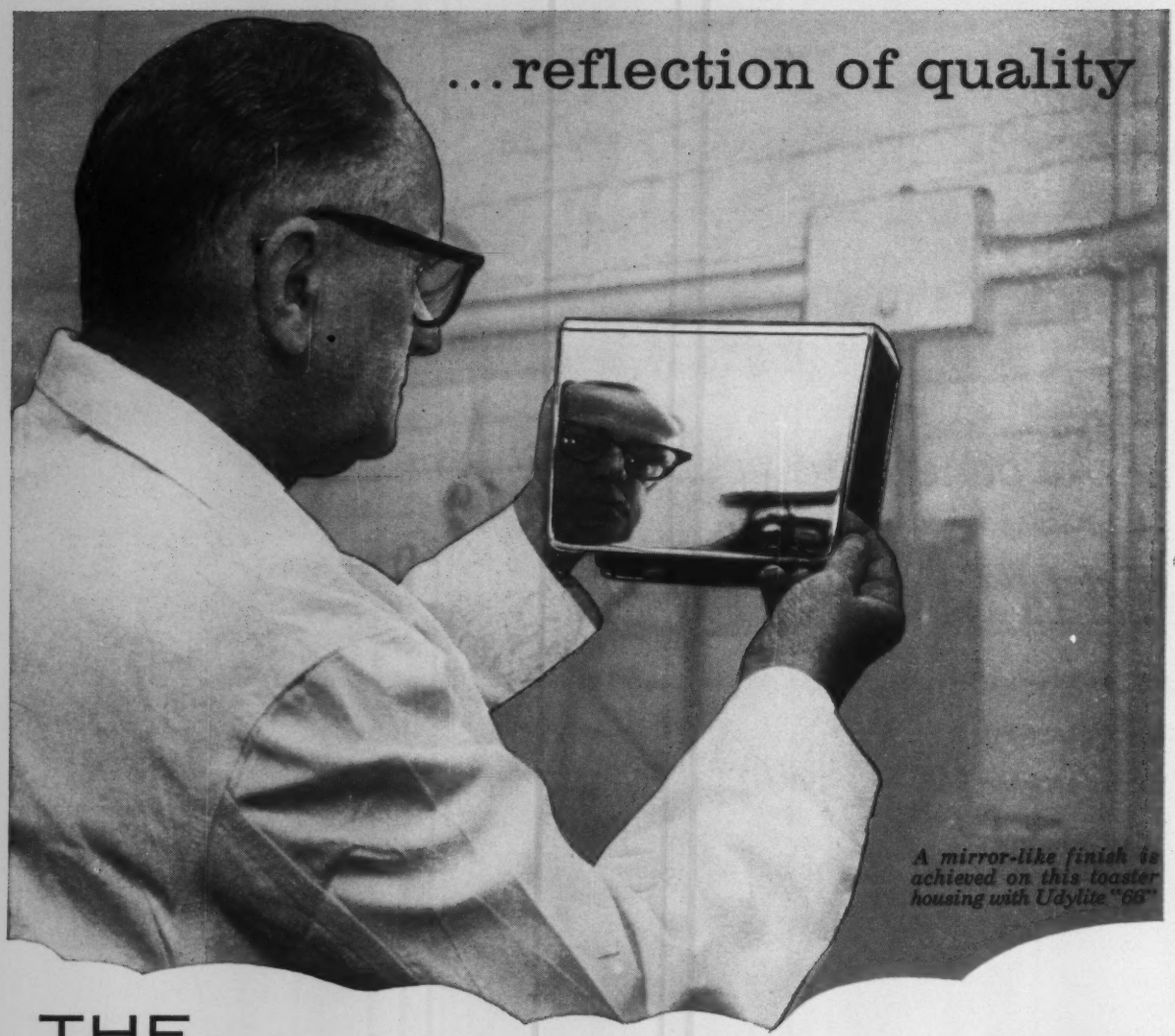
. . . a benefit to every exhibitor

METAL SHOW



Theme Symbol . . . towering above the colorful, idea-full STEEL ARENA, an exciting presentation that will radiate its effect throughout the exposition halls to provide a spectacular showcase for **all** metals and their related processes and products.

This advertisement is currently appearing in IRON AGE, STEEL, METAL PROGRESS and SALES MANAGEMENT.



A mirror-like finish is achieved on this toaster housing with Udylite "66"

THE INCOMPARABLE "66"

Udylite's Bright Nickel Process "66" is sweeping the country with new installations and conversions to provide a truly incomparable plate with almost unbelievable ease of operation. The color of the process alone, sells "66" in any comparison.

The production of your existing equipment can be *greatly increased* with the introduction of Process "66". Its outstanding qualities include exceptional levelling ability and remarkable ductility for so bright a finish.

In addition, Process "66" has overcome the problems previously considered inherent in plating over semi-bright nickel and, it is unusually receptive to chromium. You'll find that the amazing adaptability of this very bright finish makes it suitable for your finest work . . . moreover it will save you money.

A phone call or letter will start Udylite's "66" Bright Nickel process on its way to help you improve your production. If it sounds too good to be true, just send us a sample of your product . . . we will be happy to test-plate it for you with Incomparable "66". Act TODAY!

SUPER "66" For even greater brightness and levelling where absolute maximum ductility is not demanded, Udylite's SUPER "66" may be specified. You must see this finish to believe its brilliance.

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CAPITAL SPENDING THIS YEAR will get a major lift from the steel industry. During 1960, steel companies will spend $1.6 billion for new equipment and construction, according to the American Iron and Steel Institute.This is close to the record $1.75 billion spent by the industry in 1957. Last year's total was $940 million.

KEEP AN EYE ON FARM EQUIPMENT. The industry was expected to drop as much as 10 pct in 1960 sales, or at best, hold even with 1959. But sales are holding at better than predicted levels with a number of major firms. It's too early for final figures, but some implement makers say sales in 1959 surprised the industry's own forecasters with a 10 pct gain.

TWO HEAVY INDUSTRIES STEPPED INTO the economic picture with big, new orders. These are the structural steel fabricators and the freight car makers. Resurgence of both is somewhat of a surprise, although less so with rail cars. December bookings for fabricated structural steel were the best in 32 months. December orders for freight cars jumped to 10,560, from 2,624 for November.

TWO SOUTH AMERICAN FORGING PLANTS, set up by a Cleveland company to use excess shop machinery, are turning into bonanzas. One will represent a quarter of the company's income this year. And backlogs are out 18 months.

ON THE FOREIGN TRADE FRONT, new export sales strategy for industrial products will be discussed soon in Washington. The Dept. of Commerce, with an assist from State, will call in industry advisory committees from several industries to help promote exports of their products.

NEW CAR PRODUCTION CONTINUES TO SIZZLE. Output both this week and last week ran over 170,000 units. This week's schedule of 178,000 is the highest since 1955. Weekly output is creeping toward the all-time high of 184,114 set that year.

U. S. MANUFACTURERS AREN'T ALONE in facing increasing costs. Touring Japanese report their steel prices are moving up, due to heavy demand at home, and also wage increases. By U. S. standards, wage gains are minor, But it's a trend.

William Krause, left, and John Rasp of Westinghouse's Beaver plant inspect laminations delivered by "Flying Press" stacking chute.

Westinghouse blanks silicon laminations at 450 strokes/minute on Wean "gearless" press

The production of "E" and "I" laminations demands equipment with both speed and precision. At the Westinghouse Standard Control Division plant in Beaver, Pa., millions of these stampings are required each month for five models of line starters—yet each must meet final tolerances of .0003".

Westinghouse is getting both high production and tight quality control with its specially designed, coil-fed Wean "Flying Press." This exciting new press design is truly "gearless," the three cranks being synchronized with an "A" frame. The unique die motion of the "Flying Press" permits operation at up to 450 strokes/minute, or 1800 inches/minute strip feed—fully twice the speed attainable with other presses in this service. Other advantages of the Wean "Flying Press" over conventional presses are 40% longer die life, open design that permits fast, easy die changes, safety devices to prevent die damage, and automated handling of the finished pieces.

For a more detailed description of this pace-setting press application, write to Wean for an illustrated article. The new "gearless Flying Press" is typical of the advanced equipment which has earned Wean its leadership in the field of coil processing. Your experienced Wean sales engineer will be glad to tell you how this concept can help *you* cut production costs.

WEAN EQUIPMENT CORPORATION
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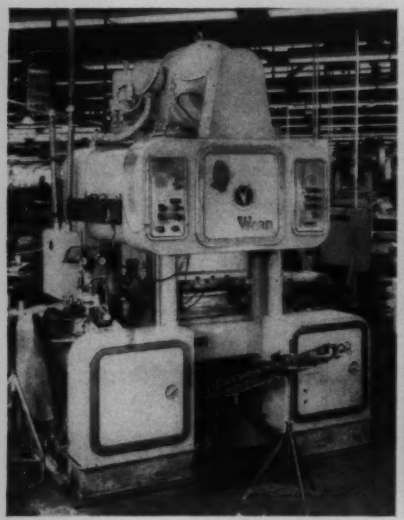
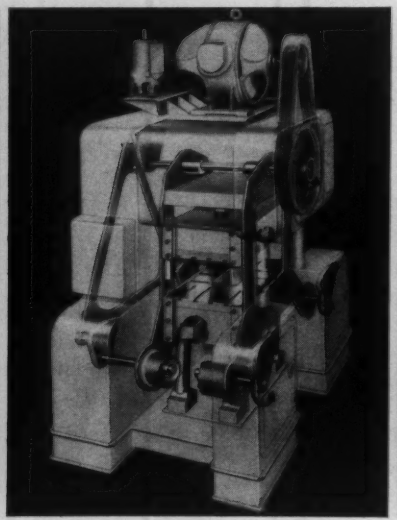
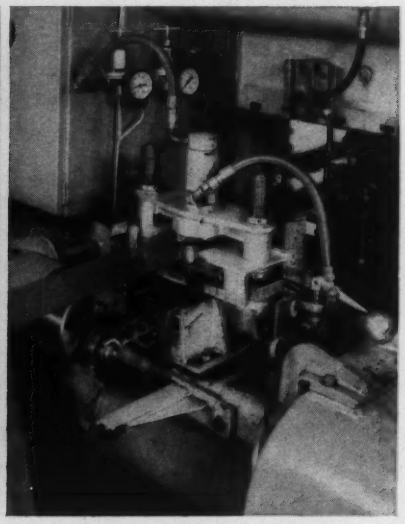
WEAN

Left to right: open design speeds die changes in "Flying Press"; cutaway shows how press cranks are tied together and the relative die motions; pad feed accurately indexes strip.







Will Ike's New Proposal Hasten Depreciation Reform?

Pres. Eisenhower wants higher taxes applied to profits from the sale of used equipment.

In return, he promises more liberal tax writeoffs. Here's what this can mean to depreciation reform.—By E. C. Beaudet.

■ By singling out depreciation for special attention in his budget message, President Eisenhower took a positive step in the direction of future depreciation reform.

The President and Treasury Secretary Anderson have asked Congress to change the tax laws which govern the sale of industry's used machinery and equipment.

They want the profits made from the sale of these items taxed as normal income rather than as capital gains.

Faster Writeoffs—This, they say, will make it possible for the Treasury to allow businessmen to shorten the periods in which they write off plant equipment for income tax purposes.

At present, the difference between the depreciated book value of equipment, and the price at which it is sold, is taxed a maximum of 25 pct. This rate holds true even if a machine is sold for more than it cost originally.

Under the Administration's new plan, businessmen would pay a top tax of 52 pct on the gain from the sale. If the equipment were to be sold at more than the original price, however, only the 25-pct rate would be applied to the **extra** gain.

Doing away with this possible area of abuse, Secretary Anderson feels, is the first step to be taken in making depreciation schedules more flexible.

This flexibility could come about administratively—by the Treasury Dept. being more sympathetic with certain industries' pleas for faster depreciation rates. Or, it could be done legislatively, through liberalization of the tax laws.

Clearing the Way — In making this proposal, the Administration hopes to clear the way for a thorough overhauling of depreciation regulations in the future.

If income from the sale of depreciated property is raised to normal tax rates, the Administration believes there will be little incentive left for a businessman to write

NEW PLAN: President Eisenhower wants to substitute income tax rates for capital gains tax on income companies derive from the sale of out-dated equipment.

MORE LIBERAL: Treasury Secretary Anderson and the President say the change would make it possible for the Treasury to liberalize depreciation rates.

HOLDS FAST: Joel Barlow, Washington tax lawyer, feels that Ike's proposal should be more positive. Until then, no changes in capital gains should be made.

GOOD START: Tax expert, Maurice E. Peloubet, states the President's depreciation proposal is a good start toward reform but too vague in its assurances.

off equipment at an overly-fast rate.

Treasury officials feel the two-sided proposal would encourage businessmen to adopt realistic depreciation rates, increase plant modernization and boost sales of new production machinery without harming much-needed government revenues.

Emphasize Output — Implicit in the proposal is the Administration's attitude toward the overall problem of depreciation reform.

The President's remarks covered only depreciable personal property such as machine tools, presses, industrial trucks and office equipment. They did not refer to real property including such long-lived assets as buildings.

The emphasis was thus placed on updating the country's production facilities to stem growing equipment obsolescence, meet foreign competition and further economic growth.

Inflation Factor — No mention was made of tying in an inflation factor with depreciation regulations.

Despite inflation's lowering impact on the value of the dollar, it would be hard for Congress to go along with any plan for business to write off more than it had originally invested.

Good Sign—The President's depreciation plan was the only new tax proposal put forth in his budget message.

By highlighting the subject in this manner, those close to the struggle for more liberal depreciation methods saw it as a forerunner to more sweeping changes. But, in itself, the proposal falls short of what industry really wants.

How Ike's New Tax Plan Works

President Eisenhower and Treasury Secretary Anderson are asking Congress to change the tax laws so that the difference between the written-down (book) value of equipment and its selling price would be taxed at ordinary income tax rates, 52 pct, rather than as capital gains, 25 pct.

Assuming that a machine was purchased for $1,000, depreciated to $500 and sold for $700, here's how the proposal would work:

Sale Price	**$700**
Book Value	**500**
Difference	**$200**

PRESENT TAX
25 pct x $200—$50

PROPOSED TAX
52 pct x $200—$104

Now let's say the same machine was sold for $1200, $200 more than the original price. The tax treatment, a mixture of income and capital gains rates, would go like this:

Sale Price	**1,200**
Book Value	**500**
Difference	**$ 700**

PRESENT TAX
$700 x 25 pct—$175

PROPOSED TAX
$500 taxed at 52 pct—$260
$200 taxed at 25 pct— 40
Total tax $300

"It's wonderful to see the President take official recognition of the problem," says New York tax expert Maurice E. Peloubet, "but when you get right down to it, all he said was that if we throw out capital gains maybe there will be some letup in strict administration of the regulations."

"All we have here is a vague promise of administrative help. It's not good enough as it stands but it's a step forward."

Positive Action — Joel Barlow, Washington attorney and frequent testifier on tax matters, claims Presiden Eisenhower's plan is very helpful but "limited so far as a revision of depreciation is concerned."

"The President and Congress," he says, "should turn this suggestion into a more positive commitment. A change in Section 1231 (capital gains treatment on a sale or exchange of depreciable property) should not be made before depreciation allowances are liberalized"

"Actually," Mr. Barlow states, "there is real justification for Section 1231 treatment, especially in the case of long-lived assets. But I doubt if really useful depreciation reform will come about unless business is willing to give it up, at least in part. There is no doubt that there has been some 'tax avoidance' in this area."

Short Session — Just how Congress will react to the President's proposal is anybody's guess right now. But the odds are presently against anything like a major overhaul of depreciation laws this year.

Chairman Wilbur D. Mills of the House Ways and Means Committee is still shooting for a major revision of the entire tax structure. These studies won't be completed in time to make recommendations to this session of Congress.

The House Ways and Means Committee is bogged down with unfinished business from the previous session. And in an election year the sessions will be concluded early so Congressmen can prepare for the November elections.

Who Got the Big Defense Contracts

The aircraft and missile industry received the highest percentage of total defense spending.

Electronics contracts related to these programs placed second.

▪ General Dynamics Corp. was the leading military contractor for fiscal 1959. It received $1,616 million business.

The top 100 defense contractors, and their subsidiaries, received 73.8 pct of the dollar volume of all contracts of $10,000 or more.

Aircraft and missile contracts in 1959 accounted for 64 pct of the contracts awarded for $500,000 or more. Electronics contracts amounted to 11 pct more.

Aircraft and Missiles Lead—Of the top 100 companies, 59 are directly involved in aircraft and missile work, or in electronics and research and development work directly related to aircraft and missile programs. Fifteen of the top 100 are suppliers of aviation gasoline, jet propulsion fuels and other petroleum products.

Another seven are builders of military base facilities. Six are shipbuilders and five are electronics makers working primarily outside aircraft and missile programs.

Subcontracting Awards—The remaining eight include firms which supply ordnance, vehicles, and transportation or other services for the military. Four of the 100 are non-profit institutions.

A large portion of prime contract funds received by the top 100 firms was subcontracted out to other companies. Companies which submitted subcontract reports to the Dept. of Defense for fiscal 1959 accounted for 88 pct of all prime contract awards to all 100 companies. These reporting companies paid out 49.6 pct of their total military receipts to their first subcontractors. Of the total of these subcontracts payments 34.7 pct went to small business firms.

Some Changes in Top Ten

(In Millions)

1957		1959	
General Dynamics	$2,358	General Dynamics	$1,616
United Aircraft	1,979	Boeing Airplane	1,167
General Electric	1,928	North American Aviation	1,018
Boeing Airplane	1,923	General Electric	914
North American Aviation	1,840	Lockheed Aircraft	899
American T&T	1,339	Douglas Aircraft	676
Lockheed Aircraft	1,193	United Aircraft	538
Hughes Aircraft	867	The Martin Co.	524
Douglas Aircraft	842	Hughes Aircraft	494
McDonnell Aircraft	816	American T&T	477

Does Industry Lag in Isotope Use?

Specialists Say It Does, and Cite Savings Potential

American industry is not taking advantage of radioisotopes, AEC experts charge.

Big savings potential is cited at industry forum to promote use.—By M. J. Tatich.

▪ Many American companies are practically throwing money away, Atomic Energy Commission scientists imply.

How? By not keeping up with the fast-growing list of industrial uses for radioisotopes, they say.

Good Reasons—AEC scientists, and some from industry make these observations: The list of industrial jobs isotopes can do is growing almost daily. In many of these, such as tracing, gaging, wear measurements and process control, isotopes offer cost advantages. With modern techniques, isotopes are safe.

Yet, in the five or six years since use of isotopes in industry has been practical, only a handful of firms have put them to work. Scientists figure savings are now somewhere between $100,000 and $400,000 over the cost of conventional methods.

Isotope Gospel — To carry the word to industry, a symposium was sponsored in Philadelphia last week by the Atomic Energy Commission, Chamber of Commerce of Greater Philadelphia, and six Philadelphia universities and educational institutions.

Dr. Paul C. Aebersold, director, Office of Isotope Development of the AEC, told the industry leaders: "Industry is particularly lagging in applying these versatile and profitable nuclear tools." He said the lack of patience in the steel industry to take the time to research and develop isotope uses is one reason isotope use in metalworking is not widespread.

Ralph T. Overman, chairman, special training div., Oak Ridge Institute of Nuclear Studies, said some companies fear working with radioactive materials. But he insists isotopes are as safe as any industrial tools, and that no accidents have been reported.

The Coming Thing—Both men are sure that if industry would become more familiar with isotopes, they would rapidly replace many conventional testing and gaging methods.

The Federal government, sponsors a school at Oak Ridge for industry. The courses vary from two to six weeks and illustrate how isotopes can be used for greater accuracy at less cost.

Cost Cutters—Dr. A. J. Stevens, president, Radiation Engineered Services, Norristown, Pa., says isotopes are now in a position to challenge radiography for testing in industry. Radium is expensive, he says, and costs 1000 to 4000 times as much, depending on quantity, as does the artificial isotope cobalt 60.

The use of the radioisotope iridium 192 for a project might cost $1000 to $1500. The same work done by present X-ray methods would cost $10,000, he says.

Are Russians Ahead Here, Too?

According to excerpts from Pravda, the Russians have made wide use of radioisotopes. Some U. S. authorities believe they are far advanced over U. S. progress in the field.

Following quotes are from V. Yemelyanov and P. Savitskiy, Russian experts in the field:

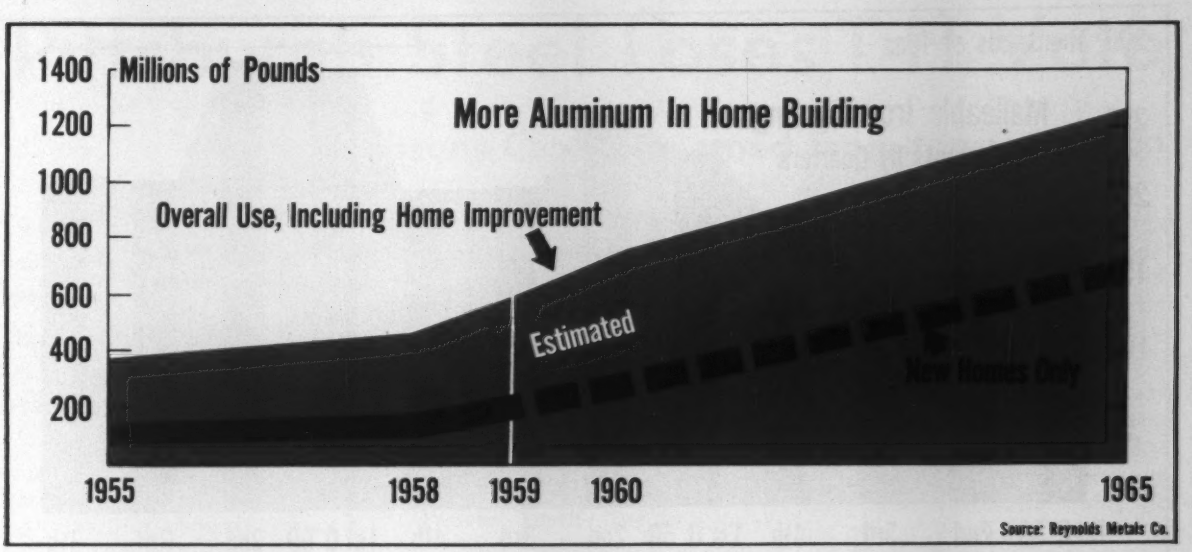
"At the Leningrad steel rolling mill, upon changing over to radioactive control devices, the output of defective products was reduced nearly four times."

"Radioactive isotopes, in combination with other technical means, permit substantial acceleration of the complex automation of blast furnaces."

"According to estimates of Soviet economists, the broad introduction of the isotope method of automation and control of manufacturing processes may bring to the national economy of the country, at the end of the seven-year plan, a savings on the order of . . . four to five billion rubles a year."

"At the Kusnetsk Matallurgical Combine, as a result of studies conducted with radioactive isotopes, a study was made of the processes in the Siemens-Martin method of steel production; interspersion, distribution of sulfur and phosphorus, and crystallization of ingots. This made it possible to develop new technological smelting processes, after the introduction of which . . . started to produce an additional 80,000 tons of steel a year."

"We deem it feasible to organize in the appropriate sovnarkhoz (industrial center) administrations special groups for the introduction of isotope methods of automation and control of production and to establish in each economic region pilot plants furnished with modern isotope equipment."



Houses: Good Market for Metals

Despite the drop in housing starts predicted for 1960, it will still be a good market for metalworking industries.

And the aluminum producers expect to do more business than ever before.—By K. W. Bennett.

■ The National Home Builders Assn., Chicago, warns that tight mortgage credit will slow the rate of U. S. housing starts in 1960. Estimates put new home starts this year at 1.1 to 1.2 million. When the final count is in, the 1959 figure is expected to exceed 1.3 million starts.

Nonetheless, housing will offer a good market for metalworkers. And aluminum could be a star performer. With a breakthrough in 1959 (see The IRON AGE, Jan. 29, 1959, p. 55), aluminum producers and fabricators sold over 300,000 tons of products to homebuilders. In 1960 this figure should hit 370,000 tons.

Market for Steel—At the same time, builders bought 2.86 million tons of steel products last year. But this is expected to drop to 2.4 million tons this year. Appliances for new homes will boost steel consumption by another 1 to 1.5 million tons. In neither case do the figures consider the amount of steel that will go to replace inventories depleted in the last half of 1959.

In addition, metalworkers will produce about 13 million electric switches, parts and motors for 660,000 kitchen fans, 876,000 warm air furnaces plus ductwork, 300 million electric outlets, and will compete with other cabinet makers for a share of the 12 million cabinet units needed.

Prefab Popularity — Builders of prefabricated homes will continue to take a growing portion of the housing market in 1960. Sales last year totaled 134,000 homes. The market forecast of one firm in the field predicts 160,000 prefabs this year.

Prefab, or manufactured homes, are the fastest growing segment of the housing market. And they are the prime market for metal products.

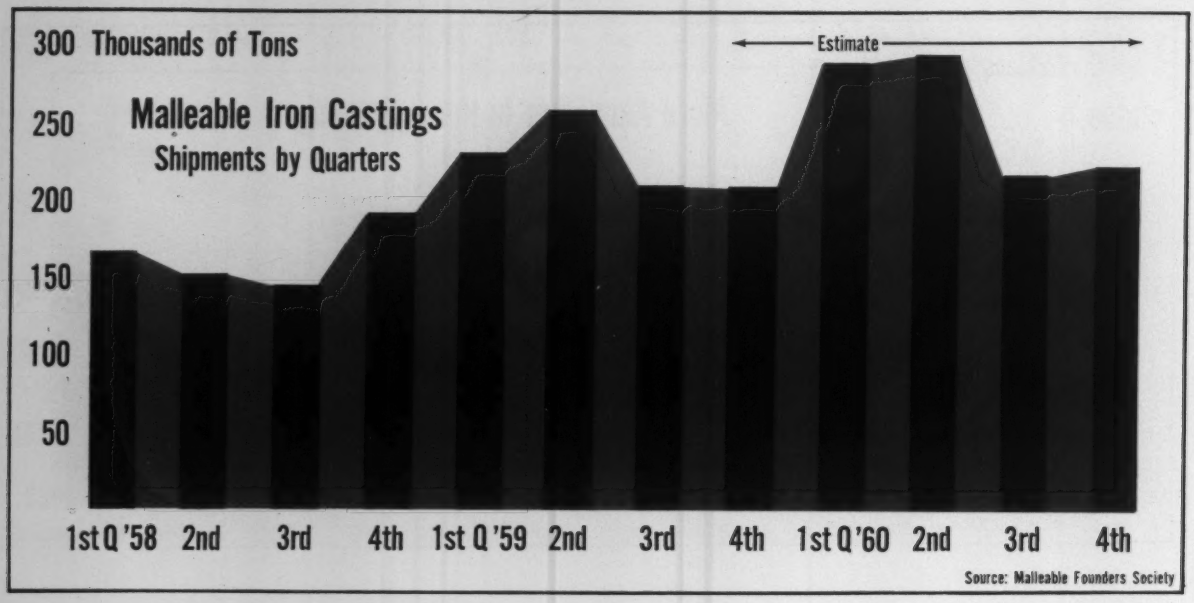
National Homes, largest in the field, is moving to nearly 100 pct aluminum homes.

Volume Market—The median income in the U. S. is some place between $5000 and $6000. As a buyer, consumers near this income level must find a low cost home. In 1959, 85 pct of new housing sold for $18,000 or less.

Prefab producers are shooting hard for this group. National can pound out a house every 9.5 minutes, and sell it complete for $12,000. Inland Homes offers a "Direct Cost Only" home package for $6450.

Expansion Predicted — In addition to the home manufacturers already using aluminum in quantity, Reynolds Metals Co. plans to enroll 500 more job-site home builders into its aluminum home program each year. Other aluminum producers are working just as hard to promote aluminum in home building.

By 1965 the aluminum industry hopefully predicts that 10 pct of housing starts will be aluminum homes—each using 1.5 to 2 tons of the metal.



Malleable Record Tied to Autos

Shipments of malleable iron castings could top the 1955 record of 1.1 million tons this year.

But it all depends on whether the auto industry, which takes about 50 pct of the output, comes close to making 7 million cars.

▪ Malleable iron castings shipments were barely dented by the steel strike. Now the foundries say 1960 could be their best year ever.

Shipments are expected to be up 12 pct, and may top the industry record of 1.1 million tons set in 1955, says Lowell D. Ryan, executive vice president of the Malleable Founders Society, Cleveland. Last year they shipped 910,000 tons, only 2 pct under predictions at the start of the year. This year the official prediction is 1,023,800 tons.

How Founders Figure — "Our hopes for a good year are predicted on 6.7 a million car year, and a big pent-up demand from auto makers since production was resumed after the steel strike.

"Autos use about half the malleable produced in the U. S. Our estimate will be conservative if the auto industry has a 7 million car year," Mr. Ryan said.

Also, "We are also looking for one of the better railroad car building years in recent history with a 32 pct increase."

Compact Cars Help — Compact cars have capitalized on malleable parts. The Corvair, Falcon and Valiant use proportionately more malleable than the bigger cars. The compacts have from 50 to 112 lb. A typical Big Three car last year had about 89 lb. And over the years, usage has been about 60 lb per car.

Other big new uses, in addition to the compacts, are the crankshaft of a new V-6 truck engine, and brackets for a truck torsion bar suspension system, formerly forgings.

Malleable parts normally on cars include crankshafts, differential carriers and covers, steering gear housings, joint yokes, door hardware, transmission gears and brackets, flanges and support arms.

All to Itself—Another bright spot for malleable is lack of heavy foreign competition. Most malleable castings are specifically engineered, rather than standardized components, so there is little opportunity for foreign firms to compete.

Some standard fittings for pipe come in from Japan. Foreign cars, of course, have their own malleable iron parts in about the same percentage as U. S. models, so they represent incoming tonnage.

Seven U. S. malleable foundries, anticipating a better year, are expanding by a total of about 95,000 tons annual capacity. Total industry capacity is about 1.25 million tons.

How Shipments Look—The projected shipments for the industry for this year, by quarters, are based on monthly production, seasonally adjusted, from 1951 through 1957. Last year normal production was exceeded for four straight months until steel strike effects set in.

Pittsburgh Steel Loses T-H Vote

But Lessons Can Be Learned From the Campaign

Vote of less than two to one against the proposal was better than expected.

But results show that workers will listen to the right approach. —By G. J. McManus.

▪ Last week's Taft-Hartley elections at Pittsburgh Steel may be a step forward in labor relations and employee communications.

As expected, the offer was rejected by the steelworkers by a vote of 4760 to 2458 and work proceeded under a contract extension. What, then, did anyone gain?

Not All Lost—For one thing, the vote was less than two to one against the company where a margin of nine to one could have been expected.

Furthermore, the offer on which the workers were voting would have meant pay cuts to about 20 pct of the work force. The proposal for the most part followed the industry pattern, but the key issue was a reduction in incentive payments.

The results showed that, despite the defeat, the company did get its message through to at least a full one third of the workers. This support may not change the union position. But it does create interest in the approach taken by Pittsburgh Steel.

The Campaign — Three distinct points stand out in the approach:

1. The company took the workers into its confidence. There was not just a broad appeal for cooperation. The company bared its financial soul, giving hard, specific, damaging figures.

2. Issues were presented in a face-to-face manner. Plant foremen called on individual workers at home to argue, explain, and question.

3. The company made a firm stand and held to its position.

In its campaign, the company took this general stand: We have serious financial problems. Our employment costs are higher than the industry average because incentives are out of line. If you cooperate by adjusting incentives, you will be protecting your job.

Personal Touch—The company's unfavorable position on earnings, costs and debt was spelled out. A story of marginal operation was publicly detailed.

Pittsburgh Steel's experience suggests that individual contact may be badly needed in industrial communications programs. Companies have relied on mass media while appealing to workers to think as individuals.

What Now—Where all this leaves the immediate issue for Pittsburgh Steel is still a question. The company said it had no intention of changing its final offer. The union is believed to have expected a new one.

On their side, union officials say there can be no blanket cut in incentives. The proposal was that incentives rates of 50 pct above the base rate be cut in half during the first year of a two-year agreement, and the remainder cut in half again the second year.

Although the union was free to resume the 116-day strike, Eugene Maurice, USW District 13 director, said the union was "not thinking in terms of a strike . . . only in terms of a fair labor contract."

The union position appeared to be that it will not say one way or another on incentives without a study of each job.

AT THE VOTING: Steelworker casts his ballot at Pittsburgh Steel's Monessen plant. NLRB supervisor watches. Company lost by two to one.

Warehouse Steel Stocks Rebound

Most Items Will Be Balanced Before 2nd Quarter Ends

From a December low of 825,000 tons, service center inventories should be up to 3 million tons by the middle of the second quarter.

And first half shipments are expected to be up 10 pct over the 1959 period.—By G. G. Carr.

▪ Strike-depleted steel service center inventories are snapping back. "From December's low point of 825,000 tons of industrial steel products, our industry expects to be able to build inventories back to three million tons during the second quarter. Because of high demand for sheets, total inventories aren't expected to reach the 3.4 million ton level, considered adequate, until August," reported R. G. Welch, executive vice president, Steel Service Center Institute, in New York last week.

Predict 10 Pct Increase—Members of SSCI's executive committee estimate first half shipments will be about 10 pct above the same 1959 period. New construction contracts, awarded since the steel strike ended, are an important overall business prop. Auto and appliance demand are keeping service center shipments of flat-rolled products very high in the Midwest. However, cutbacks in missile and aircraft programs have had a negative affect in the West.

"Those products that were in short supply early in the strike will be the last to come into balance," Mr. Welch said. "Previous predictions that our industry would require from six to eight months to rebuild stocks appear to be quite accurate."

On a product basis, service center executives see stocks this way:

Plates, Shapes, Bars—Inventories should be in balance during April in all areas. New capacity is easing wide flange beams quickly. Demand is fairly good at present, but "is steadily becoming more competitive," according to G. L. Stewart, president Jones & Laughlin Steel Warehouse Div.

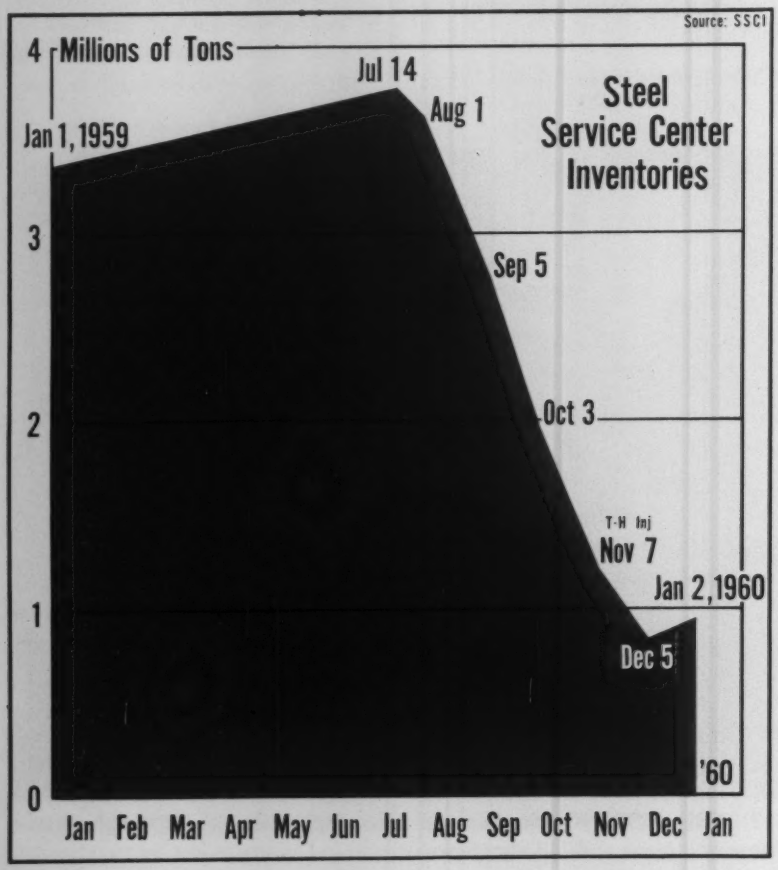
Flat-Rolled Products—Sheets will be the last to come into balance, predicts C. L. Hardy, president, Joseph T. Ryerson & Son, Inc. "There is every indication that balanced stocks of hot- and cold-rolled sheets and galvanized sheets will not be available on an industry-wide basis until the end of June and possibly even later."

Cold-Finished Bars—Service center stocks will be generally good by mid-February, with exceptions, says R. J. Heggie, vice president, A. M. Castle & Co. But inventories will not be fully balanced until late in the second quarter.

Alloy Bars—Supplies are building up well, although some items, like flats, will continue to be short for some time.

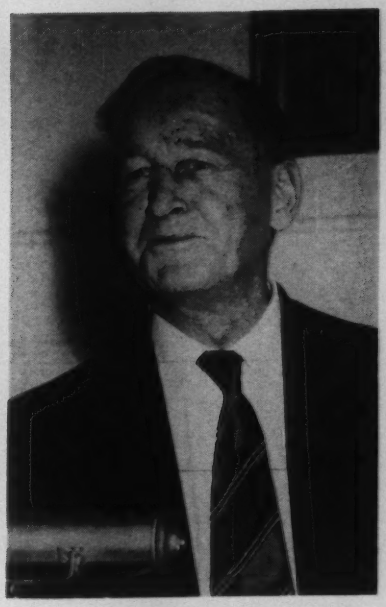
Stainless Steel—This has been the fastest to rebound. Stocks remained high for most of the strike, principally because several producers kept operating. Inventories should be complete by mid-February or March 1, according to R. W. Shaw, president, A. R. Purdy Co., Inc.

How Fast Will Stocks Rebuild?



W. E. BENNINGHOFF: The "Soaring Sixties" not guaranteed.

A. S. ORAM: He hit at "outmoded" depreciation laws.



HORACE DREEVER: "Still a large area for us to work in."

Foreign Furnaces Pose Threat

U. S. manufacturers of industrial furnaces find foreign companies undersell them by 30 pct in price.

On top of that, U. S. companies are accused of not knowing their foreign markets or how to sell them.—By G. F. Sullivan.

■ Another U. S. industry is taking a hard look at overseas markets and foreign competition. Builders of heat treating units, meeting last week in Philadelphia heard that: (1) America's competitive position in world markets had deteriorated; and (2) in addition to many steel mill products, heat treating furnaces are being sold here at prices U. S. companies can't meet.

"It is hard," said Horace Drever, Drever Co., "to describe how badly our competitive position has deteriorated in the 13 years since I began traveling to Europe and Japan. But I believe there is still a large area for us to work in—particularly in 'knowhow' agreements."

Mr. Drever spoke to the annual meeting of the Industrial Heating Equipment Assn., (IHEA) which last year sold about $125 million worth of furnaces, burners, and induction heating equipment.

Foreigners Move In — He admitted that the U. S. could not generally export furnaces, though some U. S. companies do "export" field-erected furnaces. British prices are at least 30 pct below ours. And not long ago a German unit was installed in the Southwest at 30 pct under the U. S. competition.

"If you sign licensing agreements with overseas firms," Mr. Drever warned, "you have to keep supplying them with new ideas and designs to keep it working."

Phantom Profits—A. S. Oram, assistant director of commercial research, U. S. Steel Corp., laid the problem to competition here and growth overseas. But he feels that world population growth — from 2.9 billion now to 4 billion by 1980 —will mean a chance to sell more in world markets.

Mr. Oram took a swipe at "outmoded" U. S. depreciation laws, adding that for this reason "much of what is reported as profit in the steel industry is phantom profit."

Know Your Markets—"Americans lack the aggressiveness and sales techniques of the West Germans," Senator Hugh Scott (R., Pa.) told the IHEA group. In a 40,000-mile tour of Africa and Asia, the senator said that a major complaint in U. S. embassies was the lack of market knowledge in American firms trying to sell overseas.

New Officers — Newly elected IHEA officers are: President, W. E. Benninghoff, The Ohio Crankshaft Co.; and vice-president Hugh Pugsley, Swindell-Dressler Corp. Said Mr. Benninghoff: "The forecasters call these the Soaring Sixties—but that's not guaranteed. We'll have to work for it."

Steel Spending

Near-Record $1.6 Billion Planned

▪ Spending by steel and iron companies for new plants and equipment should hit a near-record $1.6 billion this year, says the American Iron and Steel Institute.

This total will be only $150 million below the all time high, $1.750 billion spent in 1957. And it will be well above the $961 million for 1959.

Last year's spending was about 4 pct below advance estimates, largely because the 116-day steel strike interrupted work on some projects. The industry added less than 1 million tons of steel capacity during '59. (For details see foldout, following.)

Where It Goes — Spending this year will again emphasize the swing to oxygen steelmaking. Five major oxygen converter projects are either scheduled or in the planning stage. Another is near the contract stage. Industry sources estimate oxygen projects should add 7 to 10 million tons to oxygen capacity by 1962. (At present total oxygen steelmaking is 4.1 million tons.)

Bigger and Better—During '60, the trend to modernizing and expanding facilities will also continue. Few major openhearth projects are being planned. But existing furnaces are being enlarged, deepened, equipped with basic roofs and oxygen jets.

Hot-strip mills are also getting a big push in new construction and improved design. Two major plate mills are also being planned. The trend in finishing facilities is toward bigger, faster mills, with more precise controls.

Construction on sintering plans shows signs of slowing down. Recent results with pellets have brought a review of the whole beneficiation process.

Steel Spending Rebounds

Capital Expenditures by the Steel Industry

	Millions of Dollars		Millions of Dollars
1960.....	$1,600	1955.....	$ 730
1959.....	961	1954.....	680
1958.....	1,000	1953.....	1,000
1957.....	1,750	1952.....	1,170
1956.....	1,200	1951.....	1,041

British Push Drive To Boost Capacity

▪ British steelmakers are going all out to boost steel capacity.

In both 1958 and 1959 the industry spent about $280 million on new plant development. Capacity was increased by over 1 million tons each year.

Going Up—By 1965 the English are aiming for a capacity of 34 million net tons. All this, despite the fact that existing capacity was not fully used in 1959, except in a few cases.

Last year British steel mills turned out 22.6 million net tons, compared with 21.9 million tons in 1958. In 1960 the industry is expected to produce about 27 million tons.

What's Wanted — Production of cold-rolled sheet last year was 13 pct above 1958. It will rise again this year, possibly by as much as 20 pct. Expansion of existing strip mills and construction of two new ones in Wales and Scotland should help meet increased demand for sheet and tinplate.

During 1960 there may be excess capacity for heavy steel products because of decreased demand from railroads, coal mines, and shipyards. But the need for other types of steel is expected to rise still further.

There have been shortages in sheet because of the boom in automaking, appliances, and electrical machinery.

Others Also Busy—Other European steelmakers are moving at top speed. In 1959 the Federal German steel industry produced a record of over 26 million metric tons of steel. If the production from the Saar (which rejoined Germany during the year) is added, the total exceeds 29 million metric tons.

French steel output in '59 was 15.2 million metric tons, an increase of 4 pct over 1958. It was an improvement of 8 pct over 1957 totals.

precision boring–*New Britain's new approach*

New Britain Cam Actuated Vertical Precision Boring Machines offer an entirely new principle for more accurate boring and turning, plus compact exterior design and fast tooling. Rough cuts and finish cuts within close tolerances on the same set-up are characteristic. Standard models are available with maximum swing from 12″ to 17¾″ in 10 or 15 horsepower.

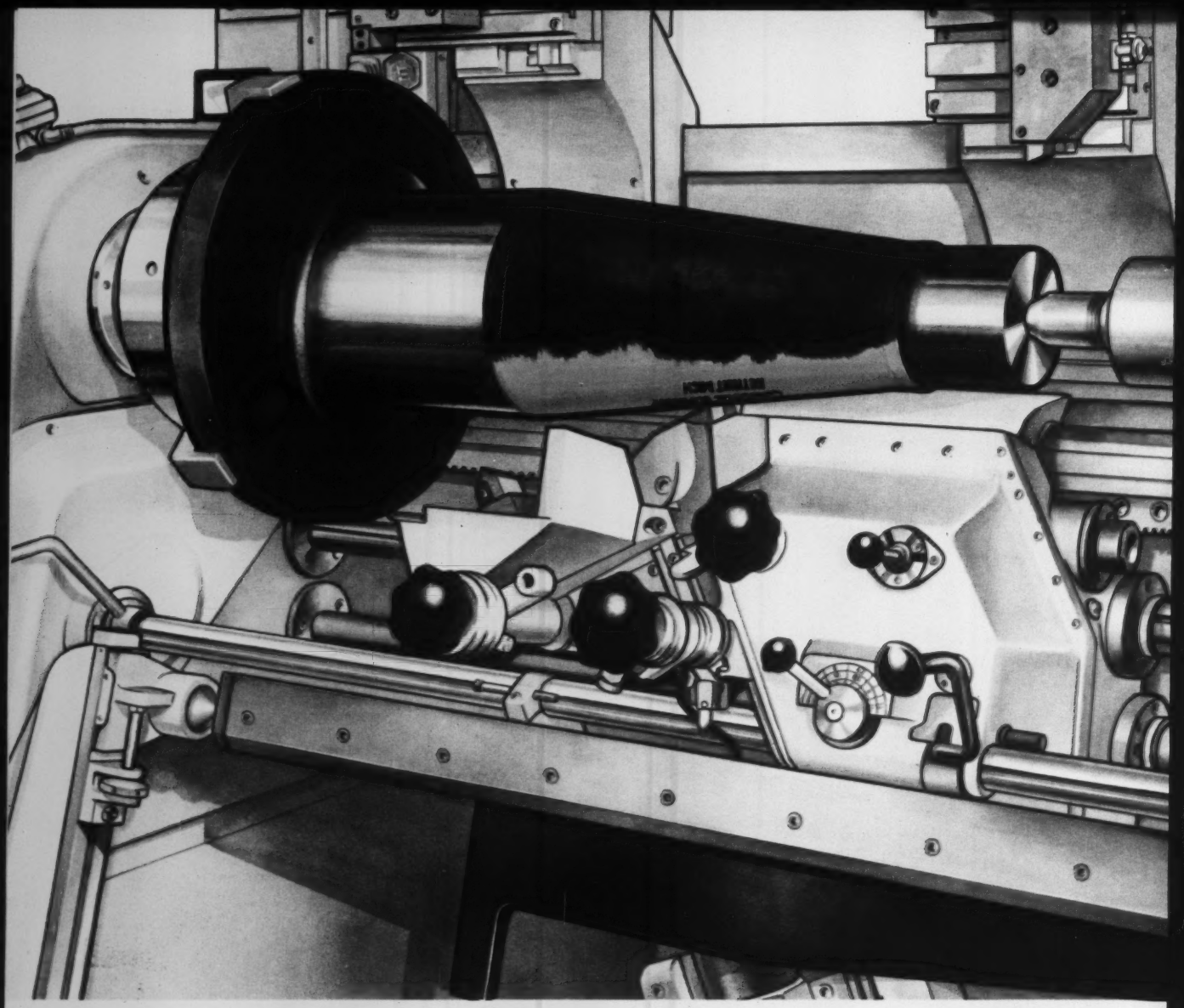
Here are a few of the major new developments incorporated in these unusual machines.

Greater accuracy. Both the vertical and cross slide cams are mounted on a common shaft which is contained inside the vertical slide. The linkages found in conventional cam-operated contouring machines are eliminated. Both the vertical and cross slides ride on preloaded roller bearings and are deflection-free.

Clean-sided design. Any number of these self-contained machines, each with one or more spindles, can be arranged side by side. Depending on how they are tooled, they operate either as a single unit or as individual machines. Parts can be inverted on adjacent machines or on adjacent spindles of the same machine, finishing both sides, completing *all* operations in one integrated, high-volume operation.

Fast tooling. Unrestricted accessibility allows rapid tool and cam changes.

Complete catalog material is available. For your copy, write New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.



why a **copying lathe**–*why New Britain* **+GF+**

Beyond a certain point sustained production of the same piece on an engine lathe becomes uneconomical. Sometimes, however, the feeling exists that a copying lathe lacks flexibility, power and ruggedness or that it is just too "special." A New Britain **+GF+** has power—25 to 40 h.p. The **+GF+** has rugged design to handle big work and it's really flexible—a prototype or flat template will reproduce one or more pieces with fast, single point tooling. Whether it's shaft work or chucking work you have to do, ease of set-up is the same. The template or prototype can be changed in minutes. No special tooling set-ups are required, either. You can quickly switch from intricate cuts on slender shafts to heavy cuts on big castings or forgings (like the one shown). Complex profiling presents no problems even on jobs requiring really heavy metal removal.

Fast set-up and changeover from one type of work to another is only part of the story. There's much more that you'll want to know about the New Britain **+GF+**. Watching one of these machines in action is the best way to get the whole story and we'd like to arrange a demonstration for you. If you'd like to look over catalog material, we have that too, of course. Write New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.

Steel Capacity

▪ Steelmakers increased U.S. capacity by 937,300 ingot tons during 1959. Effects of the strike on construction, emphasis on finishing facilities, held down the total.

New steelmaking capacity is 148.5 million tons. Both oxygen and electric furnace processes made gains in '59.

▪ The nation's steelmaking capacity increased last year by 937,300 net tons.

Total capacity, as of Jan. 1, 1960, was a new record 148.5 million ingot tons. The 1959 increase—only a little more than ½ pct—was the smallest boost in ingot capacity in recent years. During the previous year (1958), the industry added 6.9 million tons.

Delays Hurt—The long steel strike, halting building plans and building, held down the tonnage additions. Another influence was the industry's emphasis on improvement of finishing facilities rather than adding to capacity.

During 1959, two recent trends in the industry continued. These are: Increased construction of oxygen and electric furnaces. And a shift in steelmaking capacity westward.

Last year 124,240 tons of oxygen steelmaking capacity was added. This was a 3 pct increase over 1958. Total oxygen steel capacity in the U. S. is now 4.1 million tons — representing 2.8 pct of all capacity.

Electric furnace capacity, now 14.3 million tons, made even larger gains last year. There was an increase of 6.7 pct—900,810 tons.

Openhearth Increase — In 1959, openhearth capacity rose by 93,250 tons. This was far below the 4.2 million ton advance of 1958. Openhearth capacity—which accounts for about 85 pct of U. S. steelmaking—is now 126.6 million tons, up from 126.5 million tons. The gain in openhearth tonnage during 1959 was about ¾ of a pct.

Bessemer steelmaking continued to decline in '59, falling 181,000 tons to a new capacity of 3.3 million tons.

District Increases—A breakdown by IRON AGE producing districts (see below) shows the westward shift in steelmaking. Three districts — Chicago, St. Louis, and the West—accounted for a major part of the tonnage increase.

The biggest single gain, however, was made in the Pittsburgh district. A boost of 567,280 tons lifted the area's capacity to 26.1 million tons.

Chicago, with an increase of 279,440, retained its lead as the nation's largest steelmaking area. Total tonnage in the Chicago district is now 29.5 million tons.

The Philadelphia district held on to third ranking, despite a gain of only 36,260 tons. In 1959, the West picked up 275,000 tons, the St. Louis area, 257,000 tons.

Declines for Some—Many districts had declines in capacity during '59, including the Valley (Youngstown), South Ohio River, the South, Buffalo, and the Northeast.

During 1959 blast furnace capacity rose 1.8 million tons to a record level of 96.5 million tons.

IRON AGE DISTRICT CHANGES AT A GLANCE

District	Pct of U. S. Capacity		Increase in Capacity		Pct of U. S. Increase
	1960	1959	Net Tons	Pct	
Chicago	19.90	19.84	279,440	0.95	29.8
Pittsburgh	17.56	17.30	567,280	2.22	60.5
Philadelphia	13.77	13.84	36,260	0.18	3.8
Valley	10.31	10.50	−179,800	−1.16	−19.1
West	8.19	8.05	275,650	2.31	29.4
Cleveland	5.46	5.47	30,000	0.37	3.2
Detroit	5.37	5.38	42,400	0.53	4.5
Buffalo	5.09	5.12	−500	−.007	−.05
South	4.04	4.05	−32,000	−.53	−3.41
Upper Ohio River	3.92	3.98	N. C.	.....	.....
South Ohio River	3.81	4.07	−334,000	−5.5	−35.6
St. Louis	2.34	2.18	257,000	7.9	27.4
Northeast	.24	0.24	−4,410	−1.2	−.47
Total	100.00	100.00	937,300	.63	100.00

The IRON AGE

Official Steel Ingot Cap

Ingot Capacity by Districts

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons				
	1960	1959	1958	1957	1956
CHICAGO					
Acme Steel Co.	452,000	451,760	.....	.....	.....
American Steel & Wire Div.	973,000	973,000	973,000	973,000	973,000
Borg Warner Corp.					
Calumet Steel Div.	117,500	.....	100,000	100,000	100,000
New Castle, Ind.	64,000	64,000	64,000	64,000	64,000
Total	181,500	.....	164,000	164,000	164,000
Ceco Steel Corp.	150,000	.....	.....	.....	.....
Columbia Tool Steel Co.	6,600	6,600	6,600	6,600	6,600
Continental Steel Corp.	420,000	420,000	420,000	420,000	394,000
A. Finkl & Sons	33,600	33,600	33,600	33,600	33,600
H. M. Harper Co.	11,700	.....	.....	.....	.....
Inland Steel Co.	6,500,000	6,500,000	5,800,000	5,500,000	5,200,000
International Harvester Co.	1,200,000	1,200,000	1,200,000	1,200,000	1,000,000
Joslyn Mfg. & Supply Co.	37,500	37,500	37,500	37,500	37,500
Northwestern Steel & Wire Co.	825,000	825,000	825,000	825,000	825,000
Republic Steel Corp.	1,769,000	1,769,000	1,697,000	1,392,000	1,232,000
United States Steel Corp.*					
Gary	7,999,000	7,999,000	7,204,000	7,204,000	7,204,000
South Works	5,589,000	5,589,000	5,441,000	5,441,000	5,441,000
Total	13,588,000	13,588,000	12,645,000	12,645,000	12,645,000
Youngstown Sheet & Tube Co.	3,420,000	3,420,000	3,280,000	3,144,000	2,738,000
TOTAL Chicago District	29,567,900	29,288,460	27,081,700	26,340,700	25,248,700
PITTSBURGH					
Allegheny Ludlum Steel Corp.	794,700	746,700	746,700	746,700	746,700
Alco Products, Inc.	108,650	108,650	104,460	105,160	105,160
American Steel & Wire Div.	1,015,000	1,015,000	1,015,000	1,015,000	1,015,000
Armco Steel Corp.	559,000	557,000	557,000	547,000	543,000
Babcock & Wilcox Tube Co.	321,730	229,450	229,450	229,450	229,450
Bethlehem Steel Co.	2,400,000	2,400,000	2,400,000	2,330,000	2,330,000
Braeburn Alloy Steel Corp.	20,730	20,730	20,730	20,730	20,730
Byers, A. M. Co.	90,000	90,000	90,000	90,000	90,000
Colonial Steel Co.	30,000	30,000	30,000	30,000	30,000
Crucible Steel Co.	1,364,000	1,362,000	1,356,000	1,356,000	1,356,000
Edgewater Steel Co.	117,600	117,600	117,600	117,600	117,600
Firth Sterling, Inc.	20,040	20,040	20,040	20,040	20,040
Heppenstall Steel Co.	55,550	55,550	55,550	55,550	55,550
Jessop Steel Co.	35,800	35,800	35,740	35,740	33,490
Jones & Laughlin Steel Corp.					
Aliquippa	2,428,000	2,376,000	2,180,000	1,900,000	1,764,000
Pittsburgh	3,452,000	3,379,000	3,300,000	3,300,000	3,097,500
Total	5,880,000	5,755,000	5,480,000	5,200,000	4,861,500
Latrobe Steel Co.	24,000	24,000	24,000	24,000	24,000
Mesta Machine Co.	171,000	105,000	105,000	105,000	105,000
National Tube Div.	1,392,000	1,392,000	1,446,000	1,446,000	1,446,000
Pittsburgh Steel Co.	1,620,000	1,560,000	1,416,000	1,320,000	1,320,000
Union Electric Steel Corp.	25,000	25,000	25,000	26,760	26,760
Universal-Cyclops Steel Co.	77,410	77,410	70,160	70,160	70,160
United States Steel Corp.*					
Clairton	1,064,000	1,064,000	1,064,000	1,064,000	1,064,000
Duquesne	1,741,000	1,741,000	1,521,000	1,521,000	1,503,000
Braddock	2,529,000	2,529,000	2,179,000	2,179,000	2,179,000
Munhall	4,598,000	4,426,000	4,267,000	4,043,000	4,035,000
Johnstown	25,000	25,000	25,000	25,000	25,000
Total	9,957,000	9,785,000	9,056,000	8,832,000	8,806,000
Vanadium-Alloys Steel Co.	12,000	12,000	12,000	12,000	12,000
Vulcan-Kidd Steel Div. (H. K. Porter Co., Inc.)	9,600	9,600	9,600	9,600	9,600
TOTAL Pittsburgh District	26,100,810	25,533,530	24,422,030	23,744,490	23,373,740

* Central operations.

DISTRICT—COMPANY	Rated Annual Capacity—Net To				
	1960	1959	1958	1957	19
PHILADELPHIA					
Alan Wood Steel Co.	800,000	800,000	800,000	800,000	625,0
Armco Steel Corp.	106,000	102,000	102,000	102,000	102,0
Baldwin-Lima-Hamilton Corp.	188,710	188,710	188,710	189,960	189,9
Bethlehem Steel Co.					
Bethlehem	3,900,000	3,900,000	3,900,000	3,750,000	3,500,0
Sparrows Point	8,200,000	8,200,000	8,200,000	6,200,000	6,200,0
Steelton	1,500,000	1,500,000	1,500,000	1,500,000	1,500,0
Total	13,600,000	13,600,000	13,600,000	11,450,000	11,200,0
Carpenter Steel Co.	87,500	87,500	86,800	86,800	73,7
Claymont Steel (C. F. & I.)	506,500	506,500	506,500	499,500	499,5
Eastern Stainless Steel Co.	72,960	80,000	80,000	50,000	50,0
Harrisburg Steel Corp.	100,750	100,750	100,750	100,750	100,7
Lukens Steel Co.	930,000	930,000	750,000	750,000	750,0
Midvale-Heppenstall Co.	175,000	157,700	157,700	163,350	325,0
Milton Steel Products Div. (Merritt-Chapman & Scott)	110,000	90,000	90,000	90,000	90,0
Pencoyd Steel & Forge Corp.	15,600	15,600	.....	.....	.....
Phoenix Steel Corp. (Barium Steel Corp.)					
Harrisburg	486,760	486,760	486,760	486,760	490,0
Phoenixville	360,000	360,000	360,000	360,000	360,0
Total	846,760	846,760	846,760	846,760	850,0
J. A. Roebling's Sons Corp. (C. F. & I.)	235,000	235,000	235,000	235,000	235,0
United States Steel Corp.	2,687,000	2,687,000	2,400,000	2,200,000	2,200,0
TOTAL Philadelphia District	20,483,780	20,427,520	19,944,020	17,543,920	17,295,91
VALLEY (Youngstown)					
Copperweld Steel Co.	660,000	660,000	660,000	660,000	618,38
Empire-Reeves Steel Corp.	500,000	500,000	500,000	500,000	500,0
Industrial Forge & Steel, Inc.	79,200	84,000	84,000	48,600	48,6
Mesta Machine Co.	.....	66,000	66,000	36,000	.....
Republic Steel Corp.					
Canton	1,045,000	1,045,000	1,025,000	1,315,000	1,125,0
Massillon	680,000	680,000	620,000	620,000	620,0
Warren	1,520,000	1,520,000	1,408,000	1,000,000	900,0
Youngstown	2,129,000	2,129,000	2,053,000	2,189,000	2,142,0
Total	5,374,000	5,374,000	5,106,000	5,124,000	4,787,0
Sharon Steel Co.					
Farrell	1,370,000	1,268,000	1,396,000	1,305,000	1,170,0
Lowellville	593,000	593,000	593,000	593,000	593,0
Total	1,963,000	1,861,000	1,989,000	1,898,000	1,763,0
Timken Roller Bearing Co.	700,000	700,000	700,000	700,000	700,0
United States Steel Corp.	2,712,000	2,923,000	2,943,000	2,943,000	2,943,0
Youngstown Sheet & Tube Co.					
Youngstown	1,530,000	1,530,000	1,448,000	1,368,000	1,248,0
Campbell	1,800,000	1,800,000	1,772,000	1,728,000	1,764,0
Total	3,330,000	3,330,000	3,220,000	3,096,000	3,012,0
TOTAL Valley District	15,318,200	15,498,000	15,268,000	15,005,600	14,371,98

ıpacities By IRON AGE Districts

Source: American Iron and Steel Institute

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons				
	1960	1959	1958	1957	1956
WESTERN					
Bethlehem Pacific Coast Steel Corp.					
Los Angeles	478,000	478,000	478,000	478,000	452,000
San Francisco	276,000	276,000	276,000	276,000	252,000
Seattle	246,000	246,000	246,000	246,000	248,000
Total	1,000,000	1,000,000	1,000,000	1,000,000	950,000
Cabot Shops, Inc.	18,000	18,200	14,500	14,500	12,000
Cameron Iron Works	58,800	58,800	58,800	58,800	58,800
Colorado Fuel & Iron Corp.	1,800,000	1,800,000	1,800,000	1,800,000	1,485,000
Columbia-Geneva Steel Div.					
Geneva	2,300,000	2,300,000	2,262,000	2,077,000	1,937,000
Pittsburg	380,000	380,000	380,000	380,000	380,000
Torrance	237,000	228,000	228,000	222,000	222,000
Total	2,917,000	2,908,000	2,870,000	2,679,000	2,539,000
Isaacson Iron Works	102,000	102,000	102,000	102,000	102,000
Judson Steel Co.	76,500	76,500	76,500	76,500	76,500
Kaiser Steel Corp.	2,933,000	2,933,000	1,536,000	1,536,000	1,536,000
R. G. Le Tourneau, Inc.	90,000	90,000	90,000	83,100	83,100
Lone Star Steel Co.	800,000	800,000	660,000	550,000	550,000
National Supply Co.	50,000	50,000	50,200	50,200	50,200
Northwest Steel Rolling Mills	53,000	53,000	53,000	48,600	46,000
Oregon Steel Mills	150,000	150,000	150,000	120,000	120,000
Pacific States Steel Corp.	265,000	216,000	216,000	216,000	181,770
Western Rolling Mills, Div.	60,000	60,000	.....	.....	.....
Sheffield Steel Corp. (Armco)					
Sand Springs	140,000	120,000	120,000	120,000	60,000
Houston	1,365,000	1,284,000	1,284,000	1,200,000	1,050,000
Total	1,505,000	1,404,000	1,404,000	1,320,000	1,110,000
Southwest Steel Rolling Mills	100,000	45,000	45,000	45,000	45,000
Texas Steel Co.	192,280	132,450	132,450	70,450	70,450
TOTAL Western District	12,170,580	11,894,950	10,258,450	9,782,150	9,027,820
BUFFALO					
Allegheny Ludlum Steel Co.					
Dunkirk	33,000	33,000	33,000	33,000	33,000
Tonawanda	4,000	4,500	4,500	4,500	4,500
Total	37,000	37,500	37,500	37,500	37,500
Bethlehem Steel Co.	6,000,000	6,000,000	6,000,000	5,720,000	5,520,000
Erie Forge & Steel Co.	284,000	284,000	234,000	234,000	234,000
National Forge & Ordnance Co.	25,000	25,000	25,000	25,000	25,000
Republic Steel Corp.	900,000	900,000	882,000	882,000	882,000
Simonds Saw & Steel Co.	21,600	21,600	21,600	21,600	21,600
Colorado Fuel & Iron Corp.	295,000	295,000	295,000	295,000	295,000
TOTAL Buffalo District	7,562,600	7,563,100	7,495,100	7,215,100	7,015,100
DETROIT					
Allegheny Ludlum Steel Corp.	4,000	3,000	3,000	3,000	3,000
Ford Motor Co.	1,940,000	1,898,600	1,898,600	1,877,400	1,877,420
Great Lakes Steel Co.	3,700,000	3,700,000	3,500,000	3,200,000	3,200,000
(National Steel Corp.)					
McLouth Steel Corp.	2,040,000	2,040,000	1,574,000	1,380,000	1,380,000
Jones & Laughlin Steel Corp.	300,000	300,000	200,000	300,000	300,000
TOTAL Detroit District	7,984,000	7,941,600	7,175,600	6,760,400	6,760,420
CLEVELAND					
Jones & Laughlin Steel Corp.	1,945,000	1,945,000	1,820,000	1,400,000	1,305,000
National Tube Div.	2,678,000	2,648,000	2,580,000	2,565,000	2,364,000
Republic Steel Corp.	3,490,000	3,490,000	3,360,000	2,860,000	2,572,000
TOTAL Cleveland District	8,113,000	8,083,000	7,760,000	6,825,000	6,241,000

DISTRICT—COMPANY	Rated Annual Capacity—Net Tons				
	1960	1959	1958	1957	1956
SOUTHERN					
Atlantic Steel Co.	325,000	400,000	400,000	400,000	450,000
Connors Steel Div.	150,000	115,000	115,000	115,000	115,000
(H. K. Porter Co., Inc.)					
Florida Steel Corp.	51,000	43,000	.....	.....	.....
Kilby Steel Co.	34,020	34,020	34,020	34,020	34,020
Knoxville Iron Co.	38,000	38,000	38,000	38,000	38,000
Mississippi Steel Corp.	45,000	45,000	45,000	45,000	.....
Newport News S. & D. Co.	15,000	15,000	15,000	12,000	12,000
Republic Steel Corp.	1,209,000	1,209,000	1,197,000	789,000	789,000
Roanoke Electric Steel Corp.	25,000	25,000	25,000	24,000	.....
Southern Electric Steel Co.	66,000	66,000	66,000	66,000	.....
Tennessee Coal & Iron Div.					
Ensley	1,770,000	1,770,000	1,770,000	1,770,000	1,770,000
Fairfield	2,227,000	2,227,000	2,227,000	2,227,000	2,227,000
Total	3,997,000	3,997,000	3,997,000	3,997,000	3,997,000
TOTAL Southern District	5,955,020	5,987,020	5,932,020	5,520,020	5,435,020
UPPER OHIO RIVER					
Ohio River Steel Div.	136,080	136,080	136,080	136,080	136,080
(Louis Berkman Co.)					
Weirton Steel Co.	3,300,000	3,300,000	3,300,000	3,000,000	2,800,000
(National Steel Corp.)					
Wheeling Steel Corp.					
Steubenville	2,400,000	2,400,000	2,400,000	2,200,000	2,130,000
TOTAL Wheeling District	5,836,080	5,836,080	5,836,080	5,336,080	5,066,080
SOUTH OHIO RIVER					
American Compressed Steel Co.	21,600	21,600	21,600	21,600	21,600
Armco Steel Corp.					
Ashland	1,038,000	1,022,000	984,000	952,000	950,000
Middletown	2,700,000	2,557,000	2,493,000	2,249,000	1,815,000
Total	3,738,000	3,579,000	3,477,000	3,201,000	2,765,000
Connors Steel Div.	117,000	110,000	84,000	84,000	78,840
Detroit Steel Co.	1,000,000	1,500,000	1,500,000	1,500,000	1,290,000
Green River Steel Co.	183,190	183,190	183,190	183,190	179,400
Acme-Newport Steel Co.	608,000	608,000	608,000	608,000	708,500
TOTAL South Ohio District	5,667,790	6,001,790	5,873,790	5,597,790	5,043,340
ST. LOUIS					
Granite City Steel Co.	1,440,000	1,440,000	1,200,000	1,200,000	1,080,000
Keystone Steel & Wire Co.	600,000	475,000	450,000	450,000	425,000
Laclede Steel Co.	600,000	600,000	600,000	500,000	500,000
Sheffield Steel Div. (Armco)	840,000	708,000	804,000	780,000	630,000
TOTAL St. Louis District	3,480,000	3,223,000	3,054,000	2,930,000	2,635,000
NORTHEAST					
Allegheny Ludlum Steel Co.	76,300	77,000	77,000	77,000	77,000
American Steel & Wire Div.	.....	.....	287,000	287,000	287,000
Crucible Steel Co. of America					
Harrison	7,800	7,800	7,800	7,800	7,800
Syracuse	61,380	61,380	60,730	59,600	59,600
Total	69,180	69,180	68,530	67,400	67,400
Carpenter Steel Co. of N. E.	84,000	84,000	84,000	303,200	303,200
Washburn Wire Co.	93,000	93,000	93,000	93,000	93,000
Wickwire Brothers, Inc.	28,730	32,440	32,250	30,300	21,380
TOTAL Northeast District	351,210	355,620	641,780	857,900	848,980

Official Steel Industry Capacities

Source: American Iron and Steel Institute

THE IRON AGE DISTRICTS STEEL CAPACITY

In Thousands of Net Tons—Source: American Iron and Steel Institute—Compilations: The Iron Age

District	1960		1959		1958		1957		1956	
	Net Tons	Pct of Total	Net Tons	Pct of Total	Net Tons	Pct of Total	Net Tons	Pct of Total	Net Tons	Pct of Total
Chicago	29,567	19.90	29,288	19.84	27,081	19.24	26,341	19.74	25,249	19.67
Pittsburgh	26,100	17.56	25,533	17.30	24,422	17.35	23,744	17.79	23,374	18.21
Philadelphia	20,463	13.77	20,427	13.84	19,944	14.17	17,544	13.15	17,308	13.48
Valley	15,318	10.31	15,498	10.50	15,268	10.84	15,006	11.24	14,372	11.20
Western	12,170	8.19	11,894	8.05	10,258	7.28	9,782	7.33	9,028	7.03
Cleveland	8,113	5.46	8,083	5.47	7,760	5.51	6,825	5.11	6,241	4.86
Detroit	7,984	5.37	7,941	5.38	7,175	5.09	6,760	5.07	6,760	5.27
Buffalo	7,562	5.09	7,562	5.12	7,495	5.32	7,215	5.41	7,015	5.46
Southern	5,955	4.04	5,987	4.05	5,932	4.21	5,520	4.14	5,423	4.22
Upper Ohio River	5,836	3.92	5,836	3.96	5,836	4.14	5,336	4.00	5,066	3.95
South Ohio River	5,667	3.81	6,001	4.07	5,873	4.17	5,598	4.19	5,043	3.93
St. Louis	3,480	2.34	3,223	2.18	3,054	2.16	2,930	2.19	2,635	2.05
Northeast	351	0.24	350	0.24	641	0.45	857	0.64	849	0.66
Total	148,570	100.00	147,633	100.00	140,742	100.00	133,459	100.00	128,363	100.00

BLAST FURNACE CAPACITIES BY COMPANIES AND GEOGRAPHIC LOCA

Annual Capacity of Blast Furnaces as of January 1, 1960

	No. of stacks	Total annual capacity (N. T.)
Companies:		
Alan Wood Steel Company	2	544,200
Armco Steel Corporation	6	2,516,000
Sheffield Division	1	540,000
TOTAL	7	3,056,000
Berkman Company, Louis	1	136,500
Bethlehem Steel Company	33	(a) 15,000,000
Colorado Fuel and Iron Corporation	7	1,469,600
Crucible Steel Company of America	3	895,000
Detroit Steel Corporation	2	768,700
Eastern Gas and Fuel Associates	1	195,000
Ford Motor Company	3	1,331,000
Granite City Steel Company	2	792,000
Inland Steel Company	8	3,562,350
Interlake Iron Corporation	7	1,630,000
International Harvester Company	3	808,000
Jackson Iron & Steel Company	1	95,000
Jones & Laughlin Steel Corporation	13	5,061,000
Kaiser Steel Corporation	4	1,997,800
Lavino & Company, E. J.	3	(b) 184,000
Lone Star Steel Company	1	385,000
McLouth Steel Corporation	2	1,359,250
Merritt-Chapman & Scott Corp.:		
Tennessee Products & Chemical Corp.	3	217,740
National Steel Corporation:		
Great Lakes Steel Corporation	4	2,600,000
Hanna Furnace Corporation	4	850,000
Weirton Steel Company Division	4	2,400,000
TOTAL	12	5,850,000
New Jersey Zinc Company	2	(c) 112,000
Phoenix Steel Corp.	1	200,000
Pittsburgh Coke & Chemical Company	3	836,500
Pittsburgh Steel Company	3	950,000
Republic Steel Corporation	22	8,146,000
Sharon Steel Corporation	3	884,000
Sheaango Furnace Company	2	445,450
Tonawanda Iron Division, American Radiator & Stand. Sanitary Corp.	1	165,000
United States Pipe & Foundry Co.	5	900,410
United States Steel Corporation:		
United States Steel Corp. (Central Operations)	51	(d) 21,264,600
American Steel & Wire Division	6	1,855,000
Columbia-Geneva Steel Division	5	1,804,200

(a) Includes 240,000 tons ferroalloys capacity.
(b) Ferromanganese only.
(c) Spiegeleisen only.
(d) Includes 302,500 tons ferroalloys capacity.

Capacity of Blast Furnaces — January 1, 1960 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Companies (Continued):		
National Tube Division	9	3,535,000
Tennessee Coal & Iron Division	9	(e) 3,217,400
TOTAL	80	(f) 31,676,200
Wheeling Steel Corporation	6	1,954,000
Woodward Iron Company	4	772,630
Youngstown Sheet & Tube Company	13	4,140,000
GRAND TOTAL	263	(g) 96,520,630
Plant Location and Operating Company:		
Alabama		
Birmingham		
Republic Steel Corporation	2	402,000
United States Pipe & Foundry Co.	2	281,230
Ensley		
Tennessee Coal & Iron Division	6	(e) 1,829,000
Fairfield		
Tennessee Coal & Iron Division	3	1,388,400
Gadsden		
Republic Steel Corporation	2	525,000
North Birmingham		
United States Pipe & Foundry Co.	3	619,180
Woodward		
Woodward Iron Company	4	772,630
TOTAL	22	5,817,440
California		
Fontana		
Kaiser Steel Corporation	4	1,997,800
Colorado		
Pueblo		
Colorado Fuel and Iron Corporation	4	922,400
Illinois		
Chicago		
Interlake Iron Corporation	2	587,000
International Harvester Company	3	808,000
Republic Steel Corporation	1	630,000
United States Steel Corp. (Central Operations)	11	4,454,200
Youngstown Sheet and Tube Company	3	684,000
Granite City		
Granite City Steel Co.	2	792,000
TOTAL	22	7,955,200

(e) Includes 39,000 tons ferroalloys capacity.
(f) Includes 341,500 tons ferroalloys capacity.
(g) Includes 877,500 tons ferroalloys capacity.

Capacity of Blast Furnaces —

Indiana	
East Chicago	
Inland Steel Company	
Youngstown Sheet and Tube Co	
Gary	
United States Steel Corp. (Cent Operations)	
TOTAL	
Kentucky	
Ashland	
Armco Steel Corporation	
Maryland	
Sparrows Point	
Bethlehem Steel Company	
Massachusetts	
Everett	
Eastern Gas and Fuel Associate	
Michigan	
Dearborn	
Ford Motor Company	
River Rouge	
Great Lakes Steel Corporation	
Trenton	
McLouth Steel Corporation	
TOTAL	
Minnesota	
Duluth	
American Steel & Wire Division	
Interlake Iron Corporation	
TOTAL	
New York	
Buffalo	
Hanna Furnace Corporation	
Republic Steel Corporation	
Lackawanna	
Bethlehem Steel Company	
North Tonawanda	
Tonawanda Iron Division	
Tonawanda	
Colorado Fuel & Iron Corporati	
Troy	
Republic Steel Corporation	
TOTAL	

COKE CAPACITY

Annual Coke Capacity as of January 1, 1960
(Coke Capacity of Iron and Steel Industry)

	BEEHIVE		BYPRODUCT		Total annual capacity (N. T.)
	No. of ovens	Annual capacity (N. T.)	No. of ovens	Annual capacity (N. T.)	
Companies:					
Alan Wood Steel Company	.....	.....	151	600,000	600,000
Armco Steel Corporation	.....	.....	186	1,050,000	1,050,000
Sheffield Division	.....	.....	62	394,000	394,000
TOTAL	.....	.....	248	1,444,000	1,444,000
Bethlehem Steel Company	.....	.....	2,159	11,428,000	11,428,000
Colorado Fuel and Iron Corporation	.....	.....	237	985,500	985,500
Crucible Steel Company of America	.....	.....	213	790,000	790,000
Detroit Steel Corporation	.....	.....	108	550,000	550,000
Eastern Gas and Fuel Associates	.....	.....	108	664,000	664,000
Ford Motor Company	.....	.....	220	1,460,000	1,460,000
Granite City Steel Company	.....	.....	76	450,000	450,000
Inland Steel Company	.....	.....	531	2,847,000	2,847,000
Interlake Iron Corporation	.....	.....	370	1,653,000	1,653,000
International Harvester Company	.....	.....	155	750,000	750,000
Jones & Laughlin Steel Corporation	.....	.....	670	3,129,000	3,129,000
Kaiser Steel Corporation	.....	.....	315	1,502,000	1,502,000
Lone Star Steel Company	.....	.....	78	438,000	438,000
Merritt-Chapman & Scott Corp.:					
Tennessee Products & Chemical Corp.	.....	.....	44	251,500	251,500
National Steel Corporation:					
Great Lakes Steel Corporation	.....	.....	294	2,000,000	2,000,000
Hanna Furnace Corporation	.....	.....	126	*557,500	*557,500
Weirton Steel Company Division	.....	.....	294	1,900,000	1,900,000
TOTAL	.....	.....	714	4,457,500	4,457,500
Pittsburgh Coke & Chemical Company	.....	.....	105	750,000	750,000
Pittsburgh Steel Company	320	228,000	93	600,000	828,000
Republic Steel Corporation	296	215,000	1,065	*6,100,500	*6,315,500
Sharon Steel Corporation	.....	.....	60	236,000	236,000
Carpentertown Coal & Coke Co.	277	160,000	.....	.....	160,000
TOTAL	277	160,000	60	236,000	396,000
United States Pipe & Foundry Co.	.....	.....	240	1,175,000	1,175,000
United States Steel Corporation:					
United States Steel Corp. (Central Operations)	499	274,100	2,903	14,319,000	14,593,100
American Steel & Wire Division	.....	.....	295	1,418,100	1,418,100
Columbia-Geneva Steel Division	.....	.....	308	1,434,600	1,434,600
National Tube Division	.....	.....	413	1,869,000	1,869,000
Tennessee Coal & Iron Division	.....	.....	562	3,096,900	3,096,900
TOTAL	499	274,100	4,481	22,137,600	22,411,700
Wheeling Steel Corporation	.....	.....	314	1,720,000	1,720,000
Woodward Iron Company	.....	.....	256	938,000	938,000
Youngstown Sheet and Tube Company	.....	.....	805	4,376,000	4,376,000
GRAND TOTAL	1,392	877,100	13,816	71,432,600	72,309,700

* Includes 50% of coke capacity of the Donner-Hanna Coke Corporation, Buffalo, New York.

ATION

— January 1, 1960 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
.....	8	3,567,350
e Company	3	1,296,000
Central		
.....	12	5,466,000
.....	23	10,324,350
.....	3	1,058,000
.....	10	5,480,000
ciates	1	195,000
.....	3	1,331,600
ion	4	2,600,000
.....	2	1,359,250
.....	9	5,290,250
ision	2	550,000
.....	1	146,000
.....	3	696,000
n	4	850,000
.....	2	683,000
.....	7	3,590,000
.....	1	165,000
oration	2	396,000
.....	1	263,000
.....	17	5,947,000

Capacity of Blast Furnaces — January 1, 1960 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Ohio		
Campbell		
Youngstown Sheet and Tube Company	4	1,452,000
Canton		
Republic Steel Corporation	1	266,000
Cleveland		
American Steel & Wire Division	2	805,000
Jones & Laughlin Steel Corporation	2	866,000
Republic Steel Corporation	6	2,708,000
Hubbard		
Youngstown Sheet and Tube Company	1	204,000
Jackson		
Interlake Iron Corporation	1	75,000
Jackson Iron & Steel Company	1	95,000
Lorain		
National Tube Division	5	2,160,000
Lowellville		
Sharon Steel Corporation	1	149,000
Martins Ferry		
Louis Berkman Company	1	136,800
Massillon		
Republic Steel Corporation	1	266,000
Middletown		
Armco Steel Corporation	1	854,000
New Miami		
Armco Steel Corporation	2	604,000
Portsmouth		
Detroit Steel Corporation	2	768,700
Steubenville		
Wheeling Steel Corporation	5	1,708,000
Struthers		
Pittsburgh Coke & Chemical Company	1	182,500
Toledo		
Interlake Iron Corporation	2	551,000
Warren		
Republic Steel Corporation	1	630,000
Youngstown		
Republic Steel Corporation	5	1,773,000
United States Steel Corp. (Central Operations)	5	1,976,500
Youngstown Sheet and Tube Company	2	504,000
TOTAL	52	18,734,500
Pennsylvania		
Aliquippa		
Jones & Laughlin Steel Corporation	5	2,090,000
Bethlehem		
Bethlehem Steel Company	7	2,910,000
Birdsboro		
Colorado Fuel and Iron Corporation	1	151,200

Capacity of Blast Furnaces — January 1, 1960 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Pennsylvania (Continued)		
Braddock		
United States Steel Corp. (Central Operations)	7	2,963,100
Chester		
Phoenix Steel Corp.	1	200,000
Clairton		
United States Steel Corp. (Central Operations)	1	365,600
Donora		
American Steel & Wire Division	2	500,000
Duquesne		
United States Steel Corp. (Central Operations)	6	(a) 1,497,000
Erie		
Interlake Iron Corporation	1	271,000
Fairless Hills		
United States Steel Corp. (Central Operations)	3	2,039,400
Farrell		
Sharon Steel Corporation	2	735,000
Johnstown		
Bethlehem Steel Company	6	(b) 2,000,000
McKeesport		
National Tube Division	4	1,375,000
Midland		
Crucible Steel Company of America	3	895,000
Monessen		
Pittsburgh Steel Company	3	950,000
Neville Island		
Pittsburgh Coke & Chemical Company	2	654,000
Palmerton		
New Jersey Zinc Company	2	(c) 112,000
Pittsburgh		
Jones & Laughlin Steel Corporation	6	2,105,000
Rankin		
United States Steel Corp. (Central Operations)	6	2,502,800
Sharpsville		
Shenango Furnace Company	2	445,450
Sheridan		
Lavino and Company, E. J.	1	(d) 56,000
Steelton		
Bethlehem Steel Company	3	1,020,000
Swedeland		
Alan Wood Steel Company	2	544,300
TOTAL	76	26,381,750

(a) Includes 302,500 tons ferroalloys capacity.
(b) Includes 240,000 tons ferroalloys capacity.
(c) Spiegeleisen only.
(d) Ferromanganese only.

L CAPACITY

COMPANIES AND TYPES

he IRON AGE

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The IRON AGE
Chestnut and 56th Streets
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Capacity of Blast Furnaces — January 1, 1960 (*Continued*)

	No. of stacks	Total annual capacity (N. T.)
Tennessee		
Lyles-Wrigley		
Merritt-Chapman & Scott Corp.:		
Tennessee Products & Chemical Corp..	1	36,300
Rockwood		
Merritt-Chapman & Scott Corp.:		
Tennessee Products & Chemical Corp..	2	181,440
TOTAL	3	217,740
Texas		
Houston		
Sheffield Division	1	540,000
Lone Star		
Lone Star Steel Company	1	385,000
TOTAL	2	925,000
Utah		
Geneva		
Columbia-Geneva Steel Division	3	1,321,500
Ironton		
Columbia-Geneva Steel Division	2	482,700
TOTAL	5	1,804,200
Virginia		
Lynchburg		
Lavino and Company, E. J.	2	(a) 128,000
West Virginia		
Benwood		
Wheeling Steel Corporation	1	246,000
Weirton		
Weirton Steel Company Division	4	2,400,000
TOTAL	5	2,646,000
GRAND TOTAL	263	(b) 96,520,630

(a) Ferromanganese only.
(b) Includes 877,500 tons ferroalloys capacity.

Annual Steel Capacity (Ingots and Steel for Castings) as of January 1, 1960	OPEN HEARTH		BESSEMER		BASIC OXYGEN PROCESS		ELECTRIC		Total annual capacity (N. T.)
	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	No.	Annual capacity (N. T.)	
Kinds:									
Open Hearth—Basic	874	125,867,040	....	.....	....	.....	....	.....	125,867,040
Open Hearth—Acid	32	754,590	....	.....	....	.....	....	.....	754,590
Bessemer	....	.....	31	3,396,000	....	.....	....	.....	3,396,000
Basic Oxygen Process	....	.....	....	.....	12	4,157,400	....	.....	4,157,400
Electric	....	.....	....	.....	....	.....	300	14,395,900	14,395,900
Crucible	....	.....	....	.....	....	.....	1	40	40
TOTAL	906	126,621,630	31	3,396,000	12	4,157,400	301	14,395,940	148,570,970
Companies:									
Acme Steel Co.	....	.....	....	.....	2	452,000	....	.....	452,000
Acme-Newport Steel Co	7	325,000	....	.....	....	.....	3	283,000	608,000
TOTAL	7	325,000	....	.....	2	452,000	3	283,000	1,060,000
Alan Wood Steel Co.	9	800,000	....	.....	....	.....	....	.....	800,000
Alco Products, Inc.	3	105,850	....	.....	....	.....	1	2,800	108,650
Allegheny Ludlum Steel Corp.	5	324,000	....	.....	....	.....	30	588,000	912,000
American Compressed Steel Corp.	....	.....	....	.....	....	.....	1	21,600	21,600
Armco Steel Corp.	28	3,923,000	....	.....	....	.....	9	482,000	4,405,000
Sheffield Division	12	1,445,000	....	.....	....	.....	5	900,000	2,345,000
National Supply Co.	....	.....	....	.....	....	.....	3	50,000	50,000
TOTAL	40	5,368,000	....	.....	....	.....	17	1,432,000	6,800,000
Atlantic Steel Co.	....	.....	....	.....	....	.....	2	325,000	325,000
Babcock & Wilcox Co.	....	.....	....	.....	....	.....	5	321,730	321,730
Baldwin-Lima-Hamilton Corp.	5	169,920	....	.....	....	.....	2	18,790	188,710
Berkman Co., Louis:									
Ohio River Steel Division	4	136,080	....	.....	....	.....	....	.....	136,080
Bethlehem Steel Corp.:									
Bethlehem Steel Co.	131	21,434,000	3	336,000	....	.....	6	230,000	22,000,000
Pacific Coast Division	5	276,000	....	.....	....	.....	5	724,000	1,000,000
TOTAL	136	21,710,000	3	336,000	....	.....	11	954,000	23,000,000
Borg-Warner Corp.:									
Calumet Steel Division	....	.....	....	.....	....	.....	2	117,500	117,500
Ingersoll Steel Division	....	.....	....	.....	....	.....	4	64,000	64,000
TOTAL	....	.....	....	.....	....	.....	6	181,500	181,500
Braeburn Alloy Steel Corp.	....	.....	....	.....	....	.....	2	20,730	20,730
Byers Co., A. M.	....	.....	....	.....	....	.....	2	90,000	90,000
Cabot Shops, Inc.	....	.....	....	.....	....	.....	1	18,000	18,000
Cameron Iron Works, Inc.	....	.....	....	.....	....	.....	2	58,800	58,800
Carpenter Steel Co.	....	.....	....	.....	....	.....	7	87,500	87,500
Carpenter Steel of N. E., Inc.	....	.....	....	.....	....	.....	2	84,000	84,000
TOTAL	....	.....	....	.....	....	.....	9	171,500	171,500
Ceco Steel Corp.	....	.....	....	.....	....	.....	3	150,000	150,000
Colorado Fuel & Iron Corp.	27	2,601,500	....	.....	....	.....	....	.....	2,601,500
Roebling's Sons Div., J. A.	9	235,000	....	.....	....	.....	....	.....	235,000
TOTAL	36	2,836,500	....	.....	....	.....	....	.....	2,836,500
Columbia Tool Steel Co.	....	.....	....	.....	....	.....	2	6,600	6,600
Continental Steel Corp.	5	420,000	....	.....	....	.....	....	.....	420,000
Copperweld Steel Co.	....	.....	....	.....	....	.....	8	660,000	660,000
Crucible Steel Company of America	9	1,044,000	....	.....	....	.....	26	389,180	1,433,180
Detroit Steel Corp.	5	1,000,000	....	.....	....	.....	....	.....	1,000,000
Eastern Stainless Steel Corp.	....	.....	....	.....	....	.....	5	72,960	72,960
Edgewater Steel Co.	2	117,600	....	.....	....	.....	....	.....	117,600
Erie Forge & Steel Corp.	5	234,000	....	.....	....	.....	1	50,000	284,000
Finkl & Sons Co., A.	....	.....	....	.....	....	.....	2	33,600	33,600
Firth Sterling, Inc.	....	.....	....	.....	....	.....	3	20,040	20,040
Florida Steel Corp.	....	.....	....	.....	....	.....	1	51,000	51,000
Ford Motor Co.	10	1,720,000	....	.....	....	.....	5	220,000	1,940,000
Granite City Steel Co.	7	1,440,000	....	.....	....	.....	....	.....	1,440,000
Harper Co., H. M.	....	.....	....	.....	....	.....	2	11,700	11,700
Harrisburg Steel Co.									
Division Harsco Corp.	3	100,750	....	.....	....	.....	....	.....	100,750
Heppenstall Co.	2	50,470	....	.....	....	.....	1	5,080	55,550
Midvale-Heppenstall Co.	....	.....	....	.....	....	.....	3	175,000	175,000
TOTAL	2	50,470	....	.....	....	.....	4	180,080	230,550
Industrial Forge & Steel, Inc.	2	79,200	....	.....	....	.....	....	.....	79,200
Inland Steel Co.	43	6,500,000	....	.....	....	.....	....	.....	6,500,000
International Harvester Co.	11	1,200,000	....	.....	....	.....	....	.....	1,200,000
Isaacson Iron Works	....	.....	....	.....	....	.....	2	102,000	102,000
Jessop Steel Co.	....	.....	....	.....	....	.....	4	35,800	35,800
Green River Steel Corp.	....	.....	....	.....	....	.....	2	183,190	183,190
TOTAL	....	.....	....	.....	....	.....	6	218,990	218,990
Jones & Laughlin Steel Corp.	37	6,139,000	3	384,000	2	880,000	9	722,000	8,125,000
Joslyn Mfg. & Supply Co.	....	.....	....	.....	....	.....	3	37,500	37,500
Judson Steel Corp.	3	76,500	....	.....	....	.....	....	.....	76,500
Kaiser Steel Corp.	9	1,493,000	....	.....	3	1,440,000	....	.....	2,933,000
Keystone Steel & Wire Co.	5	600,000	....	.....	....	.....	....	.....	600,000
Kilby Steel Co.	....	.....	....	.....	....	.....	1	34,020	34,020
Knoxville Iron Co.	....	.....	....	.....	....	.....	2	38,000	38,000
Laclede Steel Co.	4	600,000	....	.....	....	.....	....	.....	600,000
Latrobe Steel Co.	....	.....	....	.....	....	.....	5	24,000	24,000
Le Tourneau, Inc., R. G.	....	.....	....	.....	....	.....	3	90,000	90,000
Lone Star Steel Co.	5	800,000	....	.....	....	.....	....	.....	800,000
Lukens Steel Co.	12	750,000	....	.....	....	.....	1	180,000	930,000
McLouth Steel Corp.	....	.....	....	.....	5	1,385,400	4	654,600	2,040,000
Merritt-Chapman & Scott Corp.:									
Milton Steel Division	....	.....	....	.....	....	.....	3	110,000	110,000
Mesta Machine Co.	8	151,000	....	.....	....	.....	1	20,000	171,000
Mississippi Steel Corp.	....	.....	....	.....	....	.....	1	45,000	45,000
National Forge & Ordnance Co.	....	.....	....	.....	....	.....	3	25,000	25,000
National Steel Corp.:									
Great Lakes Steel Corp.	17	3,700,000 (b)	2	.....	....	.....	....	.....	3,700,000
Weirton Steel Co. Division	14	3,300,000 (b)	2	.....	....	.....	....	.....	3,300,000
TOTAL	31	7,000,000 (b)	4	.....	....	.....	....	.....	7,000,000
Newport News Shipbuilding & Dry Dock Co.	....	.....	....	.....	....	.....	3	15,000	15,000
Northwest Steel Rolling Mills, Inc.	....	.....	....	.....	....	.....	2	53,000	53,000
Northwestern Steel & Wire Co.	....	.....	....	.....	....	.....	5	825,000	825,000
Oregon Steel Mills	....	.....	....	.....	....	.....	3	150,000	150,000
Pacific States Steel Corp.	4	265,000	....	.....	....	.....	....	.....	265,000
Pencoyd Steel & Forge Corp.	....	.....	....	.....	....	.....	1	15,600	15,600
Phoenix Steel Corp.	11	806,760	....	.....	....	.....	1	40,000	846,760
Pittsburgh Steel Co.	12	1,620,000	....	.....	....	.....	....	.....	1,620,000
Porter Co., Inc., H. K.:									
Connors Steel Division	....	.....	....	.....	....	.....	4	267,000	267,000
Vulcan Kidd Steel Division	....	.....	....	.....	....	.....	2	9,600	9,600
TOTAL	....	.....	....	.....	....	.....	6	276,600	276,600
Republic Steel Corp.	80	9,794,000	2	529,000	....	.....	23	2,419,000	12,742,000
Roanoke Electric Steel Corp.	....	.....	....	.....	....	.....	1	25,000	25,000
Sharon Steel Corp.	17	1,795,000	....	.....	....	.....	3	168,000	1,963,000
Simonds Saw & Steel Co.	....	.....	....	.....	....	.....	3	21,600	21,600
Southern Electric Steel Co.	....	.....	....	.....	....	.....	2	66,000	66,000
Southwest Steel Rolling Mills	....	.....	....	.....	....	.....	2	100,000	100,000
Texas Steel Co.	....	.....	....	.....	....	.....	4	192,280	192,280
Timken Roller Bearing Co.	....	.....	....	.....	....	.....	9	700,000	700,000
Union Electric Steel Corp.	....	.....	....	.....	....	.....	2	25,000	25,000
United States Steel Corp.:									
United States Steel Corp. (Central Operations)	177	27,829,000 (c)	8	653,000	....	.....	10	462,000	28,944,000
American Steel & Wire Division	22	1,988,000	....	.....	....	.....	....	.....	1,988,000
Columbia-Geneva Steel Division	19	2,917,000	....	.....	....	.....	....	.....	2,917,000
National Tube Division	15	3,146,000	6	924,000	....	.....	....	.....	4,070,000
Tennessee Coal & Iron Division	23	3,997,000 (b)	3	.....	....	.....	....	.....	3,997,000
TOTAL	256	39,877,000	17	1,577,000	....	.....	10	462,000	41,916,000
Universal-Cyclops Steel Corp.	....	.....	....	.....	....	.....	10	77,410	77,410
Empire-Reeves Steel Corp.	7	500,000	....	.....	....	.....	....	.....	500,000
TOTAL	7	500,000	....	.....	....	.....	10	77,410	577,410
Vanadium-Alloys Steel Co.	....	.....	....	.....	....	.....	5	12,000	12,000
Colonial Steel Co.	....	.....	....	.....	....	.....	2	30,000	30,000
TOTAL	....	.....	....	.....	....	.....	7	42,000	42,000
Washburn Wire Co.	4	93,000	....	.....	....	.....	....	.....	93,000
Western Rolling Mills Div. Yuba Consolidated Industries, Inc.	....	.....	....	.....	....	.....	2	60,000	60,000
Wheeling Steel Corp.	11	1,830,000	2	570,000	....	.....	....	.....	2,400,000
Wickwire Brothers, Inc.	....	.....	....	.....	....	.....	2	28,730	28,730
Youngstown Sheet and Tube Co.	41	6,750,000	....	.....	....	.....	....	.....	6,750,000
GRAND TOTAL	906	126,621,630	31	3,396,000	12	4,157,400	301	14,395,940	148,570,970

WELDED STEEL PRESSURE TUBING

UNIFORMLY ROUND, DEPENDABLY SOUND—readily shaped and assembled

For every designer, the many thousands of miles of welded steel tubing in boilers, heat exchangers, evaporators and condensers throughout America prove these facts: welded steel tubing has dependable strength (*what pressures do you need?*) . . . it is easily formed (*are special shapes your problem?*) . . . it is accurately concentric (*will you use more drilled holes than a steam drum?*) . . . and has no hidden interior imperfections (*the rolled steel from which welded tubing is made is sound and smooth*).

These are reassuring facts to count on, whatever your product where tubing is used. They mean easier fabrication at lower cost, together with complete dependability in performance on the job.

Great design freedom is provided by the wide range of carbon and stainless grades at your command in welded steel tubing. Write for data-filled Bulletin 8591—and for immediate information on your current requirements, call a quality welded tube producer.

LC-603

FORMED STEEL TUBE INSTITUTE, INC.

1604 Hanna Building, Cleveland 15, Ohio

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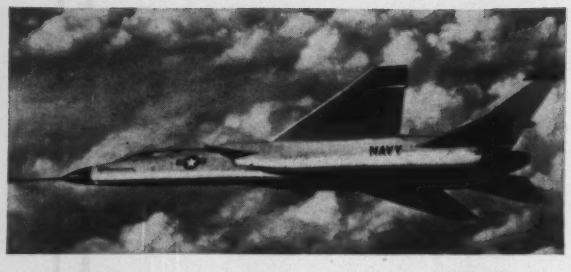
ALCOA adds strength to aluminum with LITHIUM

Alcoa's new high strength aluminum alloy containing lithium makes dramatic debut in the U.S. Navy's hottest weapons system—the A3J Vigilante, designed and built by North American Aviation Inc. By using new X-2020 in place of older, conventional alloys, North American Designers were able to make the Vigilante lighter by 168 pounds.

By adding just one per cent or so of lithium as one of the important alloying components, Aluminum Company of America has boosted the thermal barrier of a high strength aluminum alloy more than 100 F . . . trimmed weight by a precious three per cent . . . raised modulus of elasticity eight per cent. New alloy X-2020 maintains strength up to 400 F, roughly equivalent to aircraft skin temperature at speeds of 1,600 mph.

A little lithium does things for this aluminum alloy . . . just as it does things for magnesium, lead, and most other non-ferrous metals. Add ten per cent lithium to magnesium, and you have the highest strength-to-weight ratio of any known system. Minute quantities of lithium, the lightest metal, added to lead, one of the heaviest, create an alloy that's tougher, stronger, and easier to form.

Three hundred references discussing the effect of lithium additions on non-ferrous metals have been compiled by Foote in a definitive bibliography, available on letterhead request. Write Foote Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pa.



FOOTE MINERAL COMPANY

George S. Eaton

He Built a Road to Success

George Eaton was trained as a highway engineer. But he spends his time building a trade association.

Through the past 15 years he has built the NTDMA from a shaky organization into a strong body.

GEORGE S. EATON: He does a job rather than talk about it.

▪ George S. Eaton is a highway engineer by training. But he has spent the greatest part of his life laying out the right-of-way for industrial trade associations.

He has just completed 15 years as executive secretary and executive vice president of the National Tool and Die Manufacturers Assn. A shaky organization when he took over 14 months after its founding, he has seen NTDMA increase its membership from 200 to 1000 companies and become one of metalworking's major trade associations.

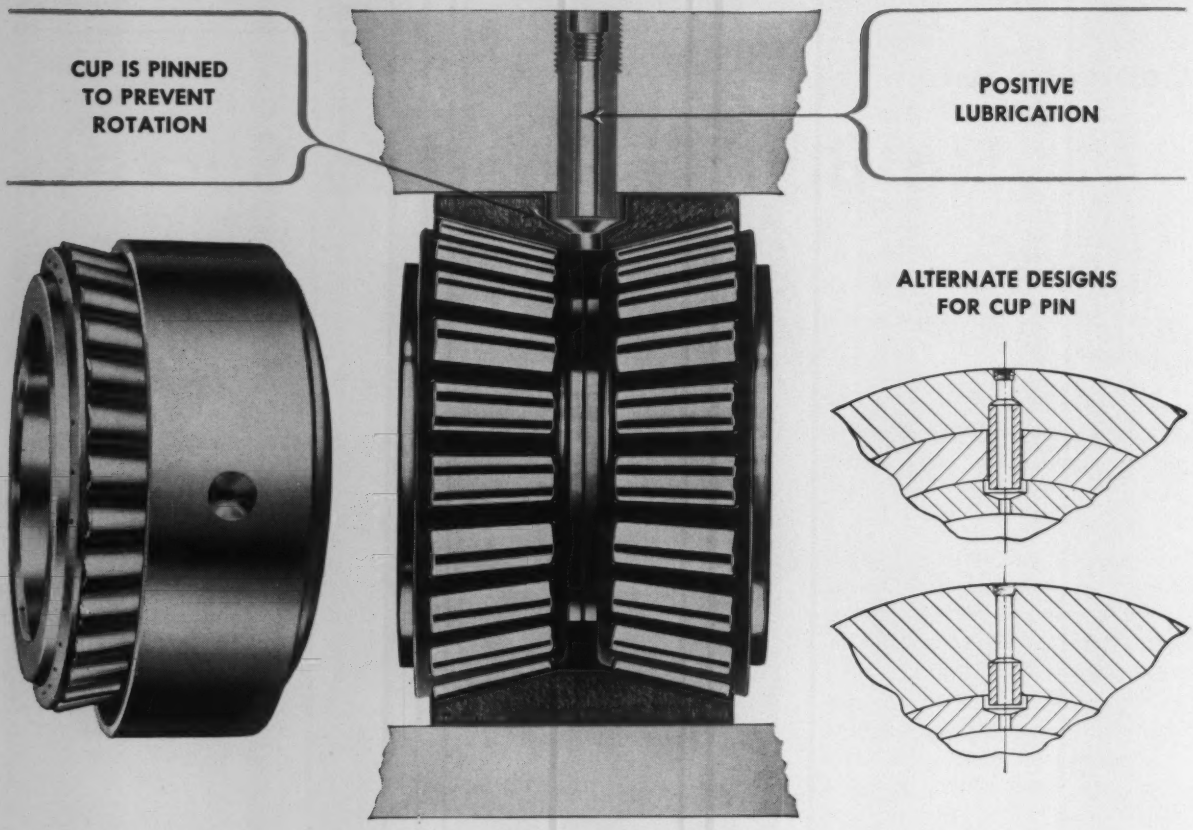
Doing the Job—Today Mr. Eaton is widely known and respected as a trade association executive. His associates say this is because he would rather get a job done than talk about it. It was this that first earned him the enthusiastic support of tool and die manufacturers.

To Mr. Eaton, tool and diemaking is "the keystone of mass production." Through the years he has lain a solid foundation for the association's activities, membership campaign, and sales promotion. He has also worked hard to gain government and industry recognition of the role of tool and diemaking by contract plants.

Fact and Logic—Using his engineer's training, he relies on logic and facts in proving the essentiality of this industry of small businesses. In a world of bigness, he has kept the spotlight focussed on NTDMA, where the average company's employment is below 50. In many House, Senate and Government Bureau offices in Washington, he is known as "Mr. Tool and Diemaking."

George Eaton took his Purdue '14 B.S. degree in civil engineering first to Lawrence College, Appleton, Wisc., and then to Clemson College, S. C., where he taught mathematics and pre-engineering until 1917. Then he joined the Universal Portland Cement Company's Highway Promotion Bureau as assistant division engineer for two years. Starting in 1921, he spent the next 20 years in all phases of trade association work—with the Portland Cement Association, the American Face Brick Association, Structural Clay Products and Associated Industries of Cleveland.

Man for the Job—During the war years he was with the War Production Board, engaged in speeding up critical aluminum forging production. As Chief of the Forging Unit, he spent most of his time at Wright Field. In 1944, NTDMA made a nation-wide search for the right man to set it on the right road, and Mr. Eaton was the choice. For the third year, he is a member of the National Defense Committee of the U. S. Chamber of Commerce.



NOW! A double-row bearing for any floating position

REDUCES WEAR AND POUNDING PROVIDES FOR POSITIVE LUBRICATION

Now you can get a new Timken® bearing—first of its kind developed for floating bearing positions—that answers the problem of excessive wear from creeping and pounding in gear drives, spindles and many other applications. It's a pin-cup, double-row tapered roller bearing. Manufacturers can assemble and adjust gear drives, then merely set the pin. Result is a bearing that floats endwise but cannot turn in the housing. It greatly reduces wear, provides for continuous, positive lubrication. This new Timken bearing gives you all these advantages for those applications where there is an inherent tendency for the cup to creep or turn in the housing.

1) *Positive lubrication* because oil is fed continuously through the pin. 2) *Longer bearing life* because bearing creep is eliminated. Related parts are better protected, too.

This new pin-cup bearing results from Timken bearing research and development. Research to make machines perform better at lower cost. And the combined, new $2½ million engineering and research facilities of the Timken Company, unique in the industry, make progress like this possible. Make it yours when you use Timken bearings in the machines you build or buy. Another reason why "Timken" is your No.1 bearing value. ***When you buy Timken® bearings you get...*** *1) Quality you can take for granted. 2) Service you can't get anywhere else. 3) The best-known name in bearings. 4) The pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

BETTER-NESS rolls on

TIMKEN®

tapered roller bearings

Why Prices Are Touchy Subject

The President's economic message focused attention on the question of prices and productivity.

Despite Administration's plea, business will find it difficult holding the price line.

■ The heat is on industrial prices this year.

Because of the wage settlements in steel and other industries, efforts to hold the price line will be difficult. Many businesses, caught in an increasing squeeze on costs, are still not anxious to increase prices. The adverse effect on sales is feared.

Call for Cuts—Now the Administration has added its plea on the side of restraint. President Eisenhower, in his annual economic measure, even stressed the benefits of price cuts.

"Price reductions warranted by especially rapid productivity gains must be a normal and frequent feature of our economy," the President said. "Without such reductions we shall not be able to keep the price level as a whole from advancing."

This is easier said than done. The wage settlements of 1959—and those to come this year—will not make it any easier.

How Wages Affect Costs—Neither will the salary rises that usually follow boosts made to wage workers. A recent study "Prices, Costs, and Output: 1947-57," points up how much weight salary increases can add to costs. (The study was made by Prof. Charles L. Schultze of Indiana University for The Committee for Economic Development.)

Says Prof. Schultze: "In manufacturing, where wage and salary data may be separately estimated, rising salaries per unit of output also contributed a very large part of the rise in costs. In the period since 1951, rising salary costs per unit accounted for more than half of the total increase in unit labor costs."

Productivity's "Magic"? — He also shows that rising productivity is not always the answer in absorbing wage increases. Six industries were singled out where demand soared ahead of the rest of the economy. These were: Durable goods, construction, transportation, communications, finance and insurance, and public utilities.

In some of these, rising output helped offset price increases. In others, it did not. The laggards: Construction and durable goods.

Adds Mr. Schultze: "If durable goods, construction (plus one added category—services) are combined, the total accounts for roughly 15.5 percentage points of the 29 pct rise in the overall price index. Yet these three represent less than one-third of the total business output."

How Economy Made Comeback

■ Any lingering doubts about the health of the economy should fade after last month's reports.

With the steel strike finally settled, the economy came back fast —and strong. Here's what happened:

Production: The Federal Reserve Board's index of industrial production (on a seasonally adjusted basis) rose to 165 pct of the 1947-49 average. This was well above the 156 of the previous month. And it was only one point below the all-time record of 166 last May and June.

Employment: The number of non-farm employees (on a seasonally adjusted basis) rose 286,000 to 52.5 million. This was close to the peak level before the strike. Unemployment did not increase as expected seasonally.

Construction: Every major type of construction registered some increase. Total new construction put in place, after declining for six months, edged up to an annual rate of $52.6 billion. Private non-farm housing starts (at a seasonally adjusted, annual rate) were 1.3 million units.

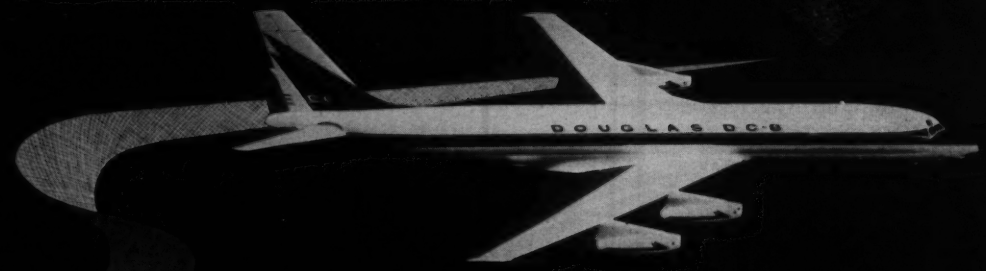
Auto assemblies: After shaking off the effects of the steel strike, auto assembly line activity rose sharply. The gains continued into January.

Engineer Search Will Get Tougher

Efforts to find engineering talent will get harder, not easier. The Engineering Manpower Commission of the Engineers Joint Council points out why:

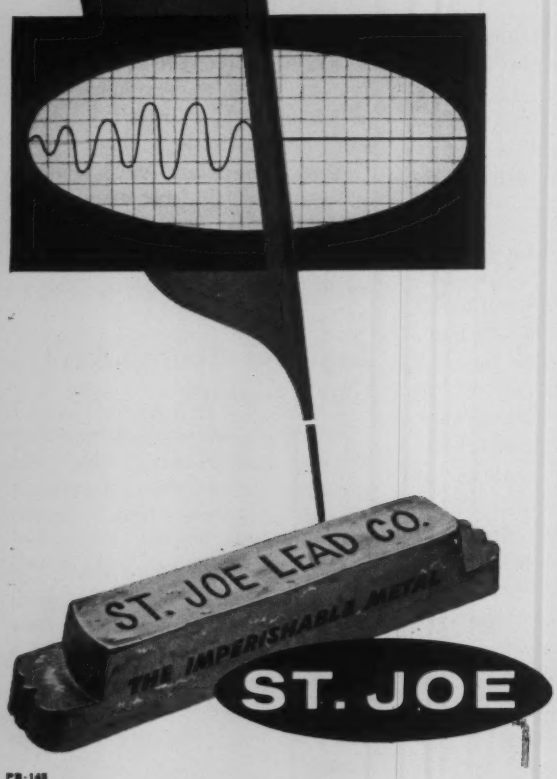
In the next five years about 37,500 engineers will graduate each year. This compares with previous predictions of close to 43,000 a year. At the same time, by 1966 more than two engineers will be hired for every one employed this year.

New Fabric Uses *POWDERED LEAD*



To Hush Jetliner's Roar

Ounce-conscious aircraft designers find LEAD worth its weight in unique sound attenuation properties



Sound attenuation is the ability or property of absorbing or deadening sound—and lead was the only material that could do the job effectively and inexpensively in this new airborne acoustical fabric.

Called Coustifab*, the new material is made of either cotton or glass fabric coated with Goodrich Geon polyvinyl material compounded with *powdered lead*. It is being used in the ceilings and rear side panels of the new Douglas aircraft to absorb low frequency vibrations which normal acoustical material cannot handle.

This exceptionally flexible way of using lead opens new avenues of application for this versatile metal. By varying the lead content which may run as high as 80% by weight depending upon the specific use, the new fabric may have a wide potential for office machines, X-ray rooms, building materials, industrial plants and other places where the unique silencing or protective properties of lead are required.

**Product of Cordo Chemical Corporation, Norwalk, Conn.*

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The Largest Producer Of Lead In The United States

PB-148

Who Said HP Race Is Dead?

Automakers Ready Bigger Engines for Economy Cars

By the time automakers introduced their new small cars, they were already well along with plans for bringing out bigger small cars.

Now they're bringing out special, higher horsepower engines for the small cars.—By A. E. Fleming.

400 HORSE CHARIOT: High performance package on the Chrysler 300F consists of a 400 hp ram manifold engine and four-speed synchro-mesh gearbox. Here driver points to car's built-in tachometer.

■ "Racing?" questioned the man with a curious expression. "What's that?" Doing the double take was a public relations executive for an automobile company. "We haven't uttered that word around here in over two years," he said.

He had been asked if his company will take part in the races, safety and performance tests at Daytona Beach, Fla., Jan. 31 to Feb. 5. He was willing to talk about safety and economy. But not speed or racing.

Brakes Applied? — The hush-cloth on horse power was draped about the industry on June 6, 1957. The Automobile Manufacturers Assn., fearing Congressional investigations, firmly suggested to its members that they get out of auto racing and refrain from mentioning speed in publicity and advertising.

Officially, it ended the carmakers' association with the racing fraternity. However, dealers took over the duty of selling special racing engines and equipment which the automakers continued to develop. Engineers say most companies have engines that will propel a car around a race track at better than 120 mph with ease.

Gentleman's Agreement — The AMA says there is no penalty for violation of its speed and horsepower resolution. It's a gentleman's agreement. Naturally, development of bigger, more powerful engines hasn't been arrested.

Ford recently came up with a 360 hp engine. There are reports it can move a car at speeds approaching 150 mph. And only a few years ago Mercury and Lincoln offered a 400 hp engine option for those with places to go and not much time to get there.

Cape Canaveral Take Note— Those same impatient motorists must now switch to a Chrysler if they don't want to step-down to something smaller. Missilemaker as well as automaker, Chrysler offers a 400 hp V-8 booster to power the first stage of its sports-type 300F series.

Even the new compact cars—developed as the automakers' answer to the flood of European economy cars, and designed to provide comfort as well as economy for critics of U. S. cars—are getting into the act.

Compact Engines—Chevrolet has developed a more powerful engine for its Corvair. It's rated at 95 hp, compared with 80 hp for the standard engine. Principal modifications to the flat, six-cylinder engine are a special camshaft for greater valve lift, larger muffler passages, and a tailpipe with a larger diameter.

As a further indication that appeal is aimed at the racing set, a new manual four-speed transmission

is also offered. And if that isn't enough, a heavy-duty chassis package is available. It offers stiffer springs and shock absorbers, rear suspension straps, front suspension stabilizer, and sintered iron metallic brake facings.

Biggest Little Engine—Not to be outdone, Ford will make available a bigger six-cylinder engine for its Falcon. Horsepower will be more than 100, but the company is reluctant to say how much more. Presumably, Falcon owners will at least be able to keep up with Corvair owners.

But both of them will have to go some to keep up with Plymouth's Valiant when this "economy car" is powered by a new option—a 148 hp slant six engine. The "goodies" that give it the go are a four-barrel carburetor, 10.5 to 1 compression ratio, dual exhaust system, and a manual choke. The owner will be able to get just as many miles from a tank of gasoline. The size of the gas tank is increased from a capacity of 13 gallons to 15. And the engine will undoubtedly require premium fuel as well.

Melody Lingers On—The new engine, however, is a special order item. Valiant doesn't intend to publicize it, nor will it be available for about two months. But it's conceivable that the engine will propel Valiants around the high-speed track at Daytona Beach in just a few days.

Comments an engineer for one automaker: "There are thousands of stockcar drivers in competition. Naturally, some of them are going to use our make of car. We don't want to be humbled. These races get plenty of attention. Interest in high speed cars isn't dead by a long shot. It never will be."

Production Records Set

Record production deeds are almost commonplace in the auto industry this month.

The week ended Jan. 16, Chevrolet produced 60,856 cars and trucks, an all-time one-week peak for auto makers. The previous high, set by Chevrolet the third week in December, 1958, was 56,007.

Volume in the record period included 42,132 conventional Chevrolets, 8532 Corvairs and 10,192 trucks. A new daily record of 10,923 units was set Jan. 11. The old record of 10,530 was set by Chevrolet on Dec. 30, 1959.

Ford Div. chipped in with a record of its own the same week as Chevrolet. In making 51,546 cars and trucks, Ford set a division record for a single week. The former high was 49,491, set in 1935.

S-P Makes Money

Studebaker's Lark convertible, lone soft-top among the compact cars, is taking a hefty share of Studebaker sales. The model accounted for almost 10 pct of Studebaker deliveries in the fourth quarter of 1959.

Studebaker's new 4-dr station wagon is also faring very well. It took over 15 pct of company sales in the introductory period.

Showing of the two newcomers helped Studebaker move up to 3 pct of the new car market in the last two months of 1959. Portion for all of 1959 was 2.5 pct.

H. E. Churchill, Studebaker-Packard president, says unaudited figures indicate net earnings of about $28.5 million for 1959. This compares to a $13.8 million loss in 1958.

More Valiants Coming

Assembly of Valiants is starting at Chrysler Corp. plants outside of Michigan. Pilot assembly operations began Jan. 19 at St. Louis. Next month they will start coming off the Newark, Del., assembly line.

Previously, only Chrysler's Hamtramck, Mich., plant produced the model. Production schedules for Valiant sedans and station wagons will be hiked from 4400 a week at Hamtramck to 7500 a week in three plants by the end of April. All plants will run two shifts.

The St. Louis plant will build up to a 1600 a week rate by the end of February. Newark is programmed for 1500 a week.

The Bull of the Woods

OH, JOE, CAN'T YOU COME SOON PLEASE? I'VE WORE OUT A NEW PAIR OF SHOES TODAY!
MAYBE COOPLE DAYS I BE ROUN' DEES VAY--ODDER PIPPLE EES GOT CHIPS TOO, YOU KNOW!
BORN THIRTY YEARS TOO SOON
T.M. Reg. U.S. Pat. Off.
1960 by NEA Service, Inc.

if cost reduction is your problem

value analysis *dictates*

NATIONAL HTM CASTINGS

To make or buy — to cast, forge or fabricate — that is often the question.

Before you decide, look into the advantages of National HTM (pearlitic malleable) castings over other methods of forming.

Among the great advantages of National HTM castings are closer as-cast tolerances that often eliminate machining operations . . . excellent response to subsequent hardening operations, either induction or flame . . . easy machinability on your present equipment . . . high ultimate strength . . . excellent non-seizing bearing qualities . . . air or liquid quenching . . . ability to be smooth-finished.

Yes, Value Analysis often makes the use of *National HTM castings a must.* And remember National HTM castings can be precision cast by the shell mold, CO_2 or green sand methods. Production costs tumble . . . performance and salability of your product spurt — with National HTM (pearlitic malleable) castings.

AA-9358

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868 — *Cleveland 6, Ohio*

The nation's largest independent producer of malleable and pearlitic malleable

MEMBER

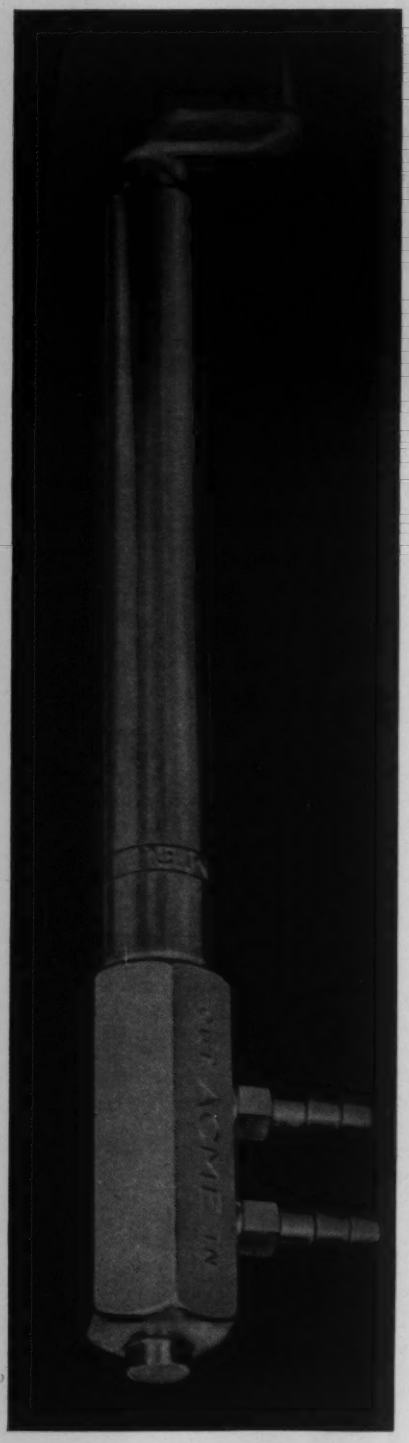
MALLEABLE CASTINGS COUNCIL

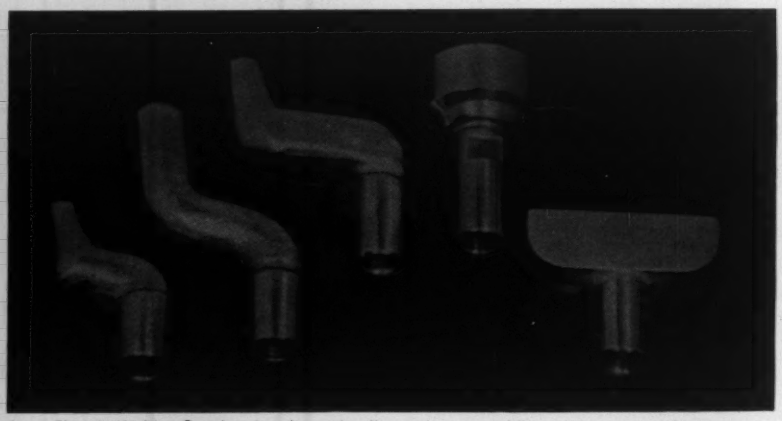
Important Physical Properties	
Brinell	163 to 302*
Yield, psi	48,000 to 85,000*
Ultimate, psi	70,000 to 110,000*
Elongation, %	7 to 2*

**Depending upon grade*

SPOT-WELDING TIPS and

electrodes of Chromium Copper-999 give superior service in high production resistance welding





Acme Electric Welder Co., Los Angeles, a leading resistance welding equipment manufacturer, produces standard spot-welding tips from Chromium Copper-999 rod, seam-welding wheels from Chromium Copper-999 sheet. Irregular shaped tips, above, are Anaconda die-pressed forgings of Chromium Copper. In pieces fabricated from rod, bar, or sheet, strength and hardness are increased by cold working after heat treatment. Anaconda gives forgings an additional cold strike after hot forging to increase surface hardness. *Left:* A forged welding tip in an Acme water-cooled tip holder.

IN resistance welding the electrodes must carry heavy currents under high pressures and at elevated temperatures. They must be made of materials that have high electrical and thermal conductivities and mechanical properties that will keep deformation and wear to a minimum. The widespread and growing use of resistance welding has stimulated research to meet the demand for more efficient and durable electrode materials.

CHROMIUM COPPER-999, one of Anaconda's high-strength, heat-treatable alloys, is an excellent electrode material with a record of superior performance in high-production welding. Electrical and mechanical properties exceed those listed for RWMA Class 2 material. Electrical conductivity is about 80% IACS and thermal conductivity is comparably high. In addition it has tensile strength of about 70,000 psi after heat treatment (compared with 48,000 psi for hard drawn ETP Copper), and its mechanical properties remain high at temperatures approaching 400 C. Available as rod, bar, sheet, tube and die-pressed forgings.

Anaconda also offers Hitenso®-961 as a more economical electrode material for use where service conditions are not severe enough to require the higher properties of Chromium Copper-999. Its properties exceed those of RWMA Class 1 material, having electrical conductivity of about 85% and tensile strength of about 60,000 psi. Available as rod, bar and plate.

TECHNICAL ASSISTANCE. For further information on these Anaconda alloys or for technical assistance in the selection of the right alloy to meet special problems, see your American Brass Company representative. Or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 5981

RESISTANCE WELDING ELECTRODE MATERIALS
ELECTRICAL COPPERS • WELDING RODS

ANACONDA®

PRODUCTS MADE BY THE AMERICAN BRASS COMPANY

Pressure Is On for a Tax Cut

It's Coming From Congressmen Up for Election

Leaders of both parties agree: There should be no reduction in taxes this year.

But pressure is building from a bloc of junior members of the Congress.—By G. H. Baker.

▪ Rank-and-file congressmen are demanding tax cuts. They are pressing leaders in the Senate and House for a major tax-cut drive this year.

So far, the leaders are standing firm against the pressure. But they may not be able to hold out for the entire six months of this session of congress.

Give It Back—The new demands for lower taxes are sparked by President Eisenhower's report that the U. S. Treasury will have a surplus of about $4.2 billion. This has excited politicians in both parties. Those up for re-election this year say this should be given back to the voters in the form of tax reductions.

But the White House and congressional leaders think otherwise. On one point, at least, they are in agreement: There will be no tax cuts in 1960. But can the leaders keep their colleagues in line?

On Pay Back Bills — How the $4.2 billion will be spent is open to discussion. President Eisenhower wants to pay off part of the staggering national debt, now close to $300 billion. Senate and House leaders say it should be spent on study and exploration of outer space, and for more missiles.

Ask Allies to Help

The Administration is again pressing other nations to shoulder a larger burden of aid to underdeveloped countries. Up to now, our allies have simply shrugged off suggestions that they help.

Now there are sound reasons why the U. S. can't continue to carry the load of world-aid alone. Most important: Our exports exceed our imports by more than $3 billion a year, which falls short by about $4.5 billion of meeting total U. S. out-payments.

It is clear this trend must be stopped.

A painful lesson the State Dept. is learning: Western Europe and Britain, rebuilt industrially largely with U. S. aid, are not the least interested in undertaking any foreign-aid programs.

Crackdown On Military Payola

Congress is considering cracking down on the military-industry version of payola.

Rep. F. Edward Hebert (D., La.), powerful chairman of the House Armed Services investigations subcommittee, is sponsoring a bill designed to slow the flood of military officers who "retire" to big-paying jobs representing defense contractors. The Hebert measure would ban military officers taking jobs selling to the defense agency for two years after their retirement.

Confusion Now Reigns — The subcommittee, in a special report, complains conflicting and confusing regulations and interpretations by the three services cloud restrictions on what types of work retired personnel can now take and when.

Last year congress rejected a stricter proposal prohibiting retired officers from taking jobs in any capacity with any defense contractor for five years.

Would One Service Sink Navy?

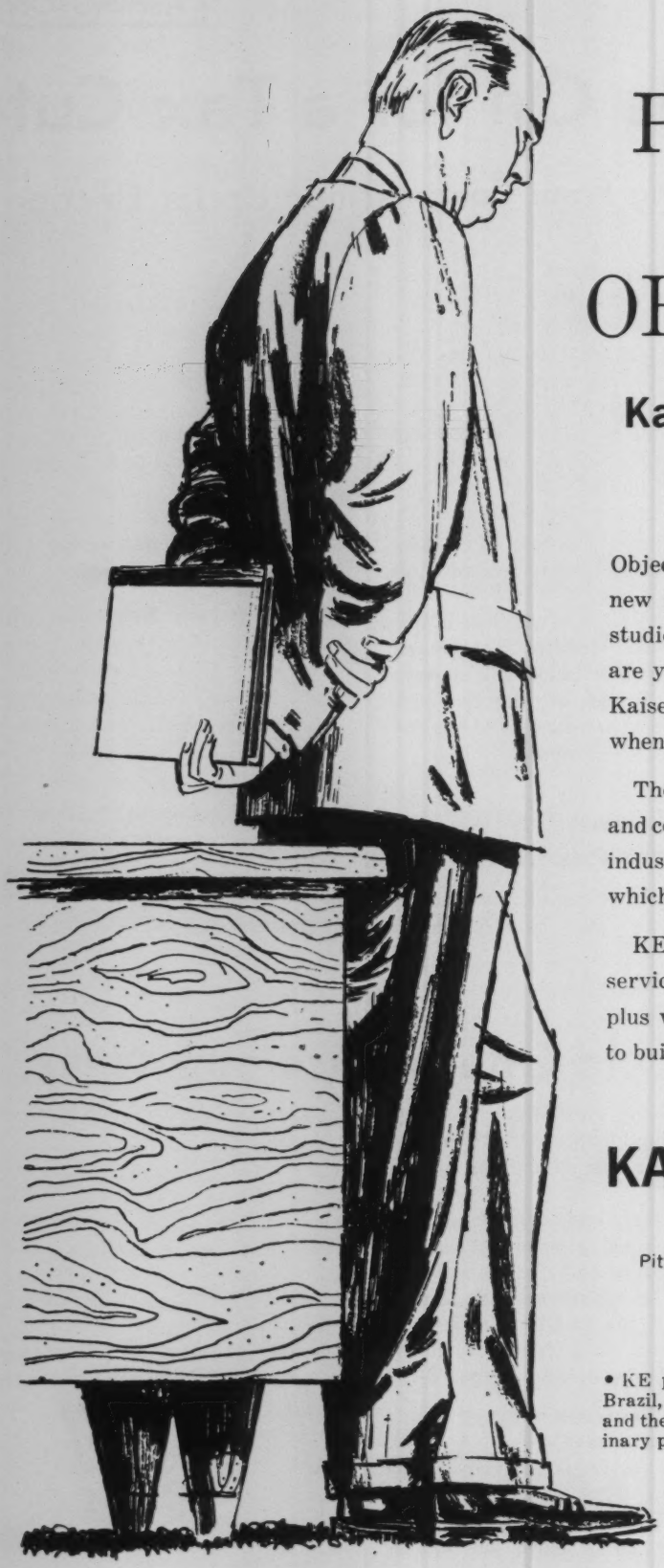
▪ The Navy grows fretful over the continuing political debate on the "need" for a single-uniform military service.

The Navy fears a single-uniform service would probably be on Air Force terms, and that its sea role would be abandoned or sharply curtailed. Marine Corps, an integral unit of the Navy, fears it would be reduced to a ceremonial guard.

One Reason — One of Navy's best arguments against a single military service is the vulnerability of fixed bases to Soviet missile submarines. The answer, the Navy observes, is to move our striking power outside the U. S. and disperse it at sea.

A nuclear exchange would cause severe damage to both the United States and the USSR. Even if land bases should be destroyed, a large part of the navies of both sides would remain intact. The ultimate victor says the Navy, will be the side that can control and exploit the vast oceanic network with offensive power—air, missile, and amphibious.

Oceans cover 139.5 million sq mi., an area about 39 times that of the U. S. and about 17 times that of Russia.



PROCEED, DEFER OR MODIFY?

Kaiser Engineers can help you decide

Objective analysis is vital to sound decision on new plant or expansion projects. Feasibility studies, economic analyses and site evaluations are yours by an outside, impartial firm when Kaiser Engineers is selected to help you decide when, how and where to proceed.

These services are in addition to the design and construction of major facilities for the Steel industry—including the proven L-D Process for which KE is the U. S. licensor.

KE offers complete, one-company, integrated service from concept through construction—plus world-wide experience and the ingenuity to build quickly, within budget.

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• KE projects include work in Argentina, Australia, Brazil, Formosa, Japan, New Zealand, as well as Canada and the United States. Assignments range from preliminary planning to plant construction.

5488-S

New Integrated Mill for West?

Pacific States Steel Plans San Francisco Mill

Pacific States Steel plans to expand capacity with a 500,000 ton mill in the San Francisco Bay area.

Hope is to complete the project within a five-year period. —By R. R. Kay.

▪ An integrated steel mill for the San Francisco Bay Area is in the making. It would be the first in northern California.

Pacific States Steel Corp., Union City, Calif., hopes to complete the project in about five years. Planned ingot capacity: 500,000 tons.

What's Happening — Pacific States bought an existing 500-ton-per-day blast furnace. It also acquired a Morgan multi-purpose continuous rolling mill and another continuous billet mill.

A fourth openhearth furnace increasing capacity to 300,000 tons—is just about ready to go.

The plan is to bring PSS rolling capacity in closer balance with its openhearth output. When the newly-bought equipment is in place, rolling capacity will rise to 425,000 tons.

At present steelmaking capacity in the California area is 4.7 million tons.

Biggest California producers are Kaiser Steel Corp., Pacific Coast Div. of Bethlehem Steel Co., and Columbia-Geneva Steel Div. of U. S. Steel Corp.

Expansion Plan—In an exclusive interview, Joseph Eastwood, Jr., PSS president, told IRON AGE: "These purchases are part of a long-term expansion program that will cost $3 million to $5 million."

It will expand the firm's product line with skelp, strip, and rods. Rebars and structurals are the main items today.

There's also a plan to make small diameter pipe for the home-building industry. Right now, Kaiser Steel Corp. is the only major pipe manufacturer in northern California. It concentrates on large diameter sizes.

Raw Material Sources — One tough problem is the iron ore supply. Mr. Eastwood says, "We're drilling 60 to 70 claims about 40 miles from Winnemucca in north central Nevada. In a few weeks we'll know more about our ore picture. It looks pretty good now."

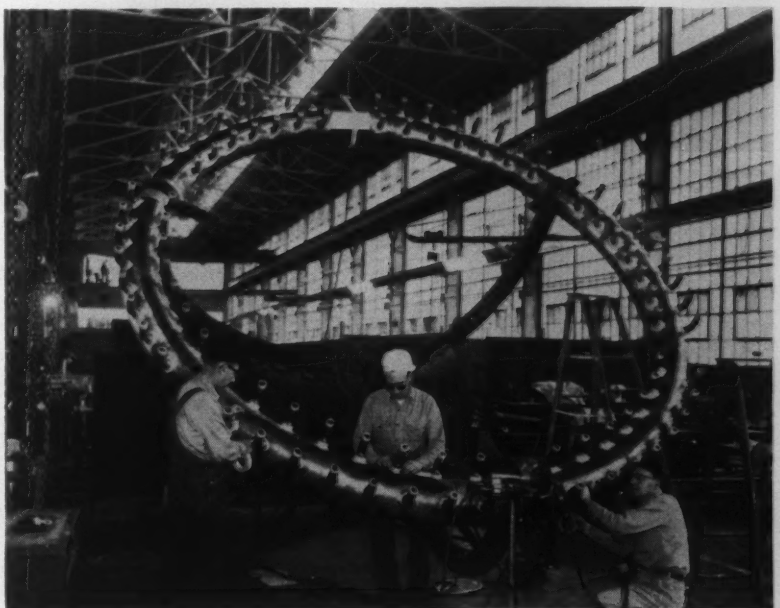
Pacific States Steel is well set with coal. It will expand its own Utah mines.

There's no truth to the newspaper stories that the entire project will run $7 million. Mr. Eastwood says that kind of money would include coking ovens. "They're not part of our thinking now. We'll buy coke to start."

The financing is from plowed-back earnings and bank loans.

A good customer for the firm's steel is its own American Forge Co. American shares the PSS site in southern Alameda County, Calif. Its products are steel balls, ⅝ in. to 6 in., for ore grinding and cement mills; and a wide variety of steel forgings.

Fabricated for a Test Reactor



OUTLET HEADER: Future home of this outlet header will be the Hanford Plutonium Test Reactor at Richland, Wash. Dravo Corp., the fabricator, made the 13 ft, 6 in. diam ring from three welded segments.

NEW INDEXING AUTOMATIC COMBINES MANY OPERATIONS ON LARGE WORK PIECE

This 40-inch Kingsbury machine omits center column, costs less

Center columns are used on most indexing machines for large work or many operations. But for some of these setups we can use this new machine with a 40-inch index table that costs less than machines with center columns.

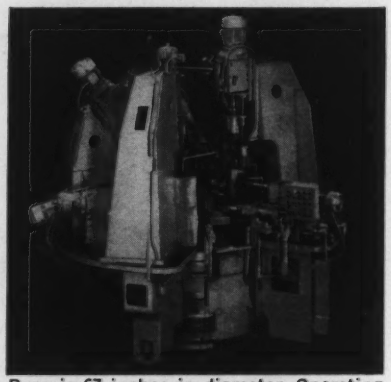
From six to twelve stations are available, but double indexing makes three to five stations possible. The mechanism that indexes and locks the table is similar in design to that used in our center column machines.

The machine shown here operates on aluminum cylinder heads. The work is tipped in each fixture so that the vertical units on columns operate on the two holes A. Behind the left column is a milling unit for the intake manifold face B. The operating unit is mounted horizontally 45° left of the radial center line through the station, and the milling head is 17° off the vertical.

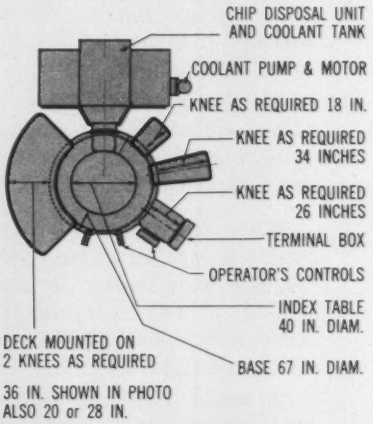
At the back of the machine are two units that work downhill at a 53° angle on hole D. Below them are two units that operate uphill at a 17° angle on two holes C. Finally at the right are two horizontal units for hole E, each mounted 45° left of the radial center line.

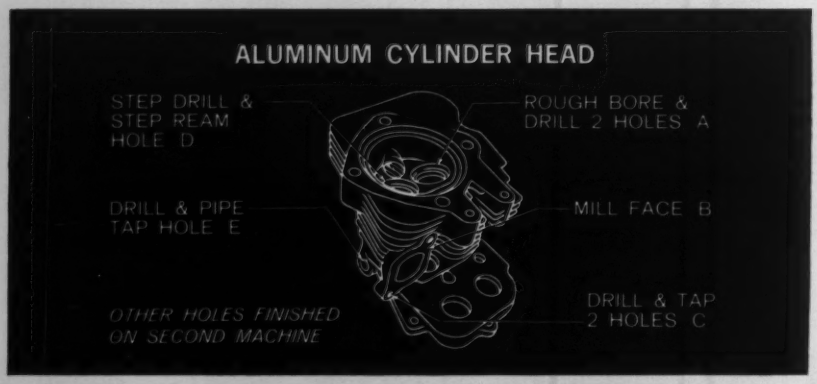
We build simple machines, too

Every machine has good basic design and accurate rugged construction. These machines pay off by operating with minimum trouble for years. If you have a job for a multi-unit automatic, we want to talk specifics with you. How about it? Kingsbury Machine Tool Corp., Keene, New Hampshire.



Base is 67 inches in diameter. Operating units are mounted on knees 18, 26 or 34 inches deep as needed, or on decks that in turn are mounted on two knees per deck. Index drive unit is inside base and has a 1 HP 1750 RPM motor.


CHIP DISPOSAL UNIT AND COOLANT TANK
COOLANT PUMP & MOTOR
KNEE AS REQUIRED 18 IN.
KNEE AS REQUIRED 34 INCHES
KNEE AS REQUIRED 26 INCHES
TERMINAL BOX
OPERATOR'S CONTROLS
INDEX TABLE 40 IN. DIAM.
DECK MOUNTED ON 2 KNEES AS REQUIRED
BASE 67 IN. DIAM.
36 IN. SHOWN IN PHOTO ALSO 20 or 28 IN.


ALUMINUM CYLINDER HEAD
STEP DRILL & STEP REAM HOLE D
ROUGH BORE & DRILL 2 HOLES A
DRILL & PIPE TAP HOLE E
MILL FACE B
DRILL & TAP 2 HOLES C
OTHER HOLES FINISHED ON SECOND MACHINE

(Below) Nine units operate from five directions at gross rate of 150 parts per hour. Index table holds five work fixtures with power clamping and unclamping.

New Machine Tool Leasing Plan

No Down Payment in Jones & Lamson Program

Vermont machine tool builder offers a new low interest leasing program.

Aimed at smaller metalworkers, large companies show interest.—By R. H. Eshelman.

■ No down payment. That's the unique feature of a new machine tool rental plan offered to metalworkers by Jones & Lamson Machine Co.

The new program offered by the Springfield, Vt., company requires no down payment, no security deposit, and no monthly payment until 30 days after shipment. It includes standard and special tooling and perishable tools.

Package Offered—The lease may include in a "package" any noncompetitive equipment needed to modernize fully a production line incorporating any new Jones & Lamson machines. This feature is planned to eliminate spot replacement, where existing machines hold back new tools from operating at full capacities. But the builder will not select machinery made by other companies; this will remain the customer's responsibility.

Normal leasing period will be five years, at low bank rates. On a five-year plan, lease payment is $20.50 per month per $1000 of equipment. Leases for other period may be negotiated. The company's guarantee applies on the five-year lease, with the customer responsible for maintenance and repair. But the lessee will have no obligations involving ownership risks other than insurance and local taxes when applicable.

Option After Five Years—At the end of the five years, the customer may either turn back the equipment and discontinue payments or continue the lease at one-third the original costs.

Leased tools will not become balance sheet items. Title will remain with the financing banks. Jones and Lamson stresses that this is a leasing plan only, in no sense an installment buying scheme. The firm points out that Federal tax advantages would be largely negated under existing regulations if the rentals were to be held as purchase payments.

No Capital Needed — Since no capital outlay is required, the tool company believes that the tools will be, in effect, paid for out of working capital, including profits realized by higher production from new equipment. This should be applicable to the 45 pct of machine tools 15 years or more old.

The new plan is aimed primarily at smaller metalworkers. These firms often have trouble accumulating or raising enough capital to expand or modernize facilities. Most existing tool rental plans require a down payment or deposit of at least one-third the price.

And this in itself can be a sizable amount. Financing charges are also significantly higher.

How Much Demand — Larger firms are also showing interest in the plan. They see it as a way to exploit technical advances and overcome obsolescence without tieing up large sums of capital for the long periods required by present depreciation and amortization laws.

How much business the lease plan will bring in admittedly remains the tool builder's big question. Private estimates range from 20 to 40 pct of 1960 sales.

Jones & Lamson Tool Rentals

ITEM	MONTHLY RENTAL CHARGE
Optical Comparator, 30-in. screen	$246.00
Numerically Controlled Positioning Table	615.00
Turret Lathe	510.00
Automatic Tracing Lathe	922.50
Fay Automatic Lathe	676.50
Form Grinder	656.00

INDUSTRIAL BRIEFS

Hydrofoil Craft Coming—A $1.5 million contract has been let to Dynamic Developments, Inc., an affiliate of Grumman Aircraft Engineering Corp., for design and construction of an 80-ton, 60-80 knot ocean-going hydrofoil craft. It is a joint government-industry financed project with Grumman - Dynamic Developments, General Electric, and other firms bearing part of the production costs.

New President for IHEA—W. E. Benninghoff, vice president and TOCCO Div., general manager, The Ohio Crankshaft Co., Cleveland, was elected president of the Industrial Heating Equipment Assn. at its annual winter meeting in Philadelphia, Jan. 18-19.

Aluminum from Venezuela—Negotiations for building an aluminum reduction plant in Venezuela are proceeding between the Venezuelan government and Reynolds International, Inc. The project involves importing bauxite and reducing it to pure aluminum by using power from the Venezuelan government's hydroelectric plant being built on the Caroni River.

Tools From Cleveland — Small Tools, Inc., 13700 Beaumont Ave., Cleveland, has been formed to supply manufacturers with new and used tools, tooling, inspection equipment, and small machines. Small Tools is also specializing in tooling for turret lathes.

California Fiberglass—A new $2 million plant has been opened by Filon Plastics Corp. in Hawthorne, Calif. The company manufactures fiberglass reinforced plastic building panels. The new facility features four patented continuous production lines capable of tripling the annual capacity of the company's former facilities in El Segundo.

Servo Plans Expansion — Servo Corp. of America announces acquisition, subject to approval of the California Corporations Commissioner, of a West Coast subsidiary, Electro-Pulse, Inc., Culver City, Calif. Electro-Pulse will continue to operate as an independent wholly-owned subsidiary. Acquisition will involve a stock transfer agreement.

Change at McJunkin—McJunkin Corp. will absorb its Pittsburgh subsidiary, the Chandler-Boyd Co. The 50-year-old firm was purchased by McJunkin in 1957 and it has continued to operate as Chandler-Boyd, a separate but wholly-owned subsidiary. Now it will be consolidated with the parent company and operated as McJunkin's Pittsburgh branch.

Lee Wilson Overseas—The Lee Wilson Engineering Co., Cleveland, and its European licensees have formed a new corporation known as Lee Wilson Engineering Co., S. A., headquartered in Fribourg, Switzerland. It will coordinate sales and manufacturing facilities for the new open coil process of gas alloying and annealing in both the European Common Market and Free Trade Area.

From N. Y. to N. J.—The L. S. Starrett Co. has relocated its New York branch with the opening of an integrated sales office and warehouse building at 48 Commerce St., Springfield, N. J.

"If I don't see a little more animation, there's going to be a lot more automation."

Portable Radar—Radar systems that will provide the U. S. with a portable early warning radar will be manufactured on a production basis at Westinghouse Electric Corp.'s Electronics Div., Baltimore, Md. The systems will be built for the Air Force and Marine Corps under a $10.6 million contract.

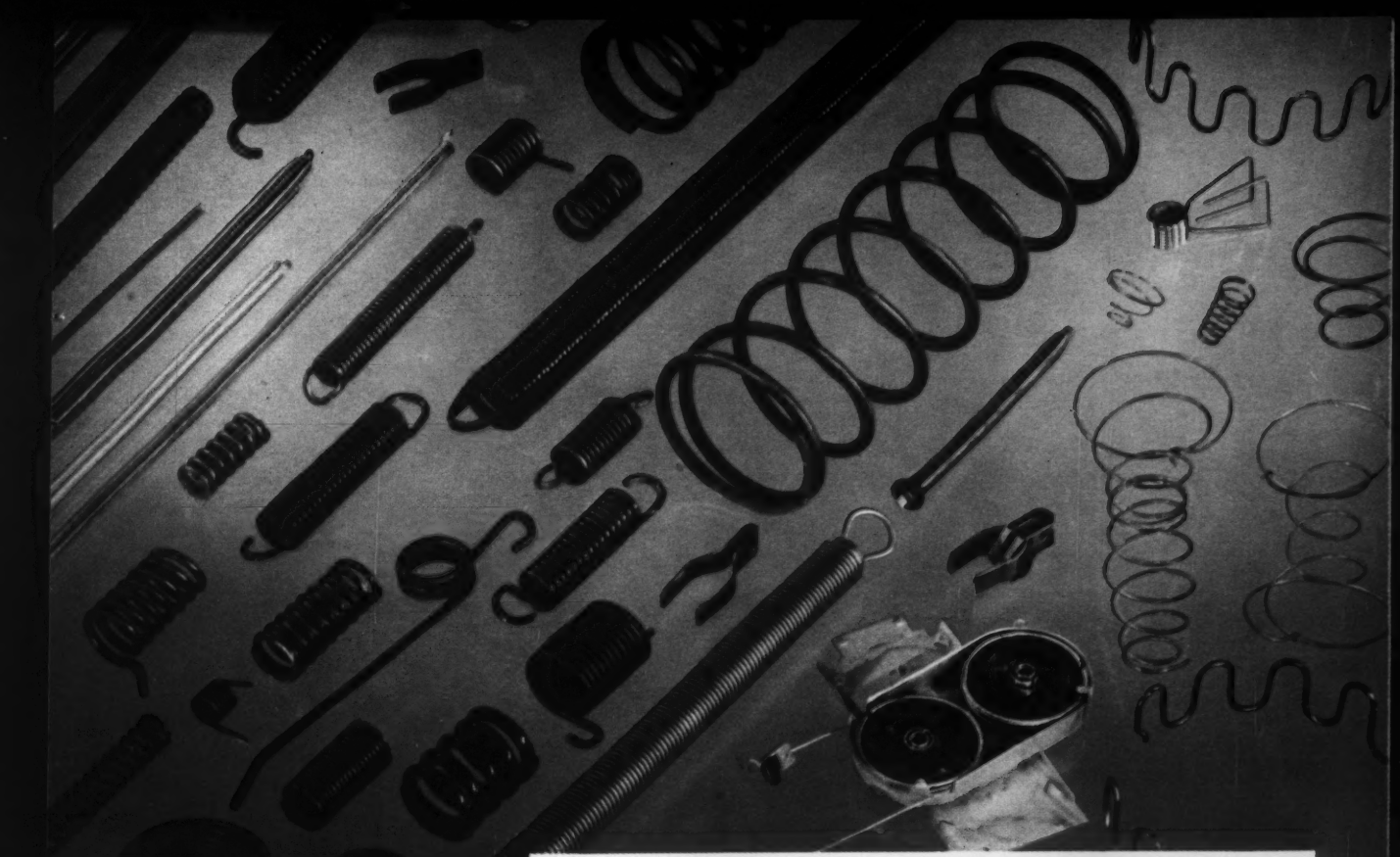
Coming Events—The 1960 Metal Show sponsored by the American Society for Metals will be held the week of Oct. 17 in the Philadelphia Trade and Convention Center. Technical sessions of the ASM will place emphasis on the engineering aspects of metals, with sessions at the Bellevue-Stratford Hotel, and the exposition hall itself.

Gas Cleaning by Joy—Dust and fume collection at Jones & Laughlin Steel Corp.'s new steelmaking facilities at its Cleveland Works will be accomplished by a unique $5 million gas cleaning system. This system was engineered and will be installed by Western Precipitation Div. of Joy Mfg. Co.

Move in the West—United States Chemical Milling Corp. is moving its Flotrusion Div. from Glendale, Calif., to Manhattan Beach on Feb. 1. Flotrusion is a division of Darco Industries, Inc., a wholly-owned subsidiary of USCM.

Change in Ohio—E. F. Resch has acquired the Ohio Pipe Bending & Machine Co., Cleveland. The name of the new corporation is Ohio Pipe Valves & Fittings, Inc. It will distribute pipe valves and fittings as well as fabricate steel pipe and tubing. Mr. Resch was formerly vice president, sales, Sawhill Tubular Products, Inc., Sharon, Pa.

Isotopes for France—The Budd Co. delivered an overseas shipment of radioactive isotopes when it turned over 1000 curies of cobalt 60 to the Commissariat a l'Energie Atomique — the French Atomic Energy Commission. These isotopes will be used as a radiation source for studies at CEA's Nuclear Research Center at Saclay, near Paris.



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The variety in which Roebling offers these spring materials is equally impressive. They are available in hard drawn, hard rolled, annealed or soft, tempered or untempered. Types include zigzag and no-sag wires; upholstery and mechanical spring wires; valve spring wire; clock- and motor-type spring steels and flat spring steels of all types and description.

Whatever the type, size or characteristics you require — Roebling can fit your needs exactly. You'll find that Roebling quality means maximum production from your machines and consistent uniformity in your product.

For spring wire and flat spring steel information, contact Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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Riverside continuous casting saves you production time, cuts rejects

Phosphor Bronze and other copper-base strip, rod, and wire from Riverside produces consistently better end products for you—free of weak points that result in rejected pieces or whole batches.

How do we do it? By continuous casting, a special Riverside-Alloy process—a process that eliminates air holes and impurities, leaving a dense, homogeneous casting for better wire-drawing and other fabrication requirements.

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good riddance to "Swiss Cheese" castings!

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These coatings for PRE-FINISHING your products have been exposure-proved for more than 14 years

CAN YOU AFFORD LESS?

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Sherwin-Williams SUPERCLAD and KEMCLAD Enamels for the pre-finishing of continuous metal strip have been exposure-proved on exterior and interior applications for as long as 14 years. First in the field of finishes for aluminum house-siding, awnings, Venetian blinds and many other related products, Sherwin-Williams offers products backed by complete field performance records and experience.

More than 1,000,000 aluminum-siding homes in all sections of the country, pre-finished with Sherwin-Williams SUPERCLAD and KEMCLAD materials, are evidence of this background.

Specify Sherwin-Williams and be *sure,* on the coated metals you use or the coatings you buy. If you *don't* pre-coat or use pre-coated metals—better investigate! The Sherwin-Williams Co., General Industrial Division, Cleveland, Ohio. In Canada: 2875 Centre St., Montreal.

SHERWIN-WILLIAMS / INDUSTRIAL FINISHES

FROM CREATIVE CRUCIBLE: HIGH SPEED STEELS THAT MAKE BETTER TOOLS POSSIBLE

UNGROUND CLASS "C" HOBS, *made from Crucible's M2S, consistently meet runout tolerances as required.*

ACCURATE HOBS— WITHOUT GRINDING!

Toolmakers hold hob tolerances to less than 0.001" without finish grinding—because of improved manufacturing skills and continually improved Rex® High Speed Steels.

Today's toolmakers are not only producing accurate unground hobs to closer tolerances – they're also making them stronger, longer-lasting and with fewer grinding stresses.

What is behind this development? It's the skill of the toolmakers – combined with continuing Crucible developments that improve the quality of Rex High Speed Steels. Crucible tool steel metallurgists, working closely with producers of fine precision tools, are able to devise mill manufacturing practices to provide steels ideally suited to specific applications.

At Crucible, Rex High Speed Steels have always been produced under the close personal supervision of the most experienced men in the industry. Today, these men utilize the most advanced electronic instrumentation to assure the production of highest quality steels. For example, they use precision instruments to control the temperature of the molten metal, in the melting furnace, so each heat is produced under identical conditions. New techniques permit greatly improved deoxidation of the liquid steel. New ingot mold designs provide freedom from segregation when the steel solidifies. And all Rex High Speed Steel billets are inspected ultrasonically before they are rolled or forged.

As a result, Rex High Speed Steels continue to make the best hobs because they offer:

more uniform distribution of carbides throughout the section. This ensures minimum size change, greater predictability in heat treatment, greater hardenability and more uniform hardness in the heat-treated tool:

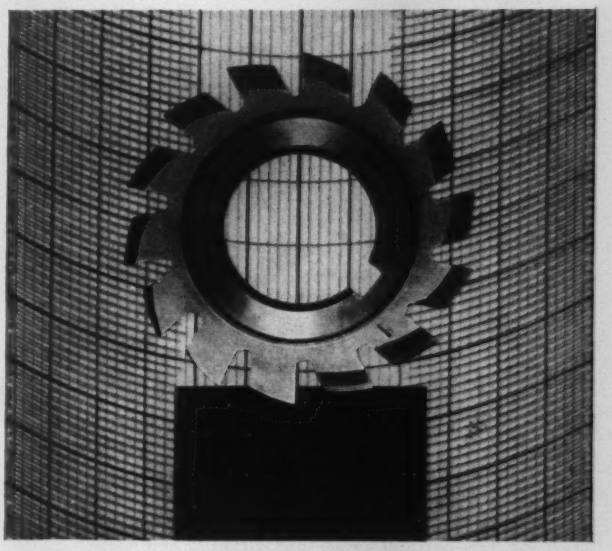
more uniform distribution of sulfides in the free-machining grades. And this provides improved machinability and superior surface finish.

Single-Thread Gear-Hob Tolerances (in Ten Thousandths of an Inch)

	DIAMETRAL PITCH										
	1 Thru 1.999	2 Thru 2.999	3 Thru 3.999	4 Thru 4.999	5 Thru 5.999	6 Thru 8.999	9 Thru 12.999	13 Thru 19.999	20 Thru 29.999	30 Thru 50.999	51 and Finer
RUNOUT											
Outside Dia. C	50	45	40	25	20	17	17	12	12	10	8

Table: Metal Cutting Tool Handbook

FINAL PROOF OF A HOB'S ACCURACY. *This lead variation chart, produced by a special electronic recorder, provides a check of every tooth in the hob. Checks are made "against perfection" — so, any deviation shows up on the chart. Photomicrograph shows tooth area's structure and the uniform distribution of carbides in Crucible Rex M2S. (Photo: 100X dia.)*



BETTER TOOLS, THROUGH BETTER STEELS. *The constant improvement of Rex High Speed Steels ensures the increasingly greater performance of fine twist drills, taps, broaches and cutters — as well as hobs.*

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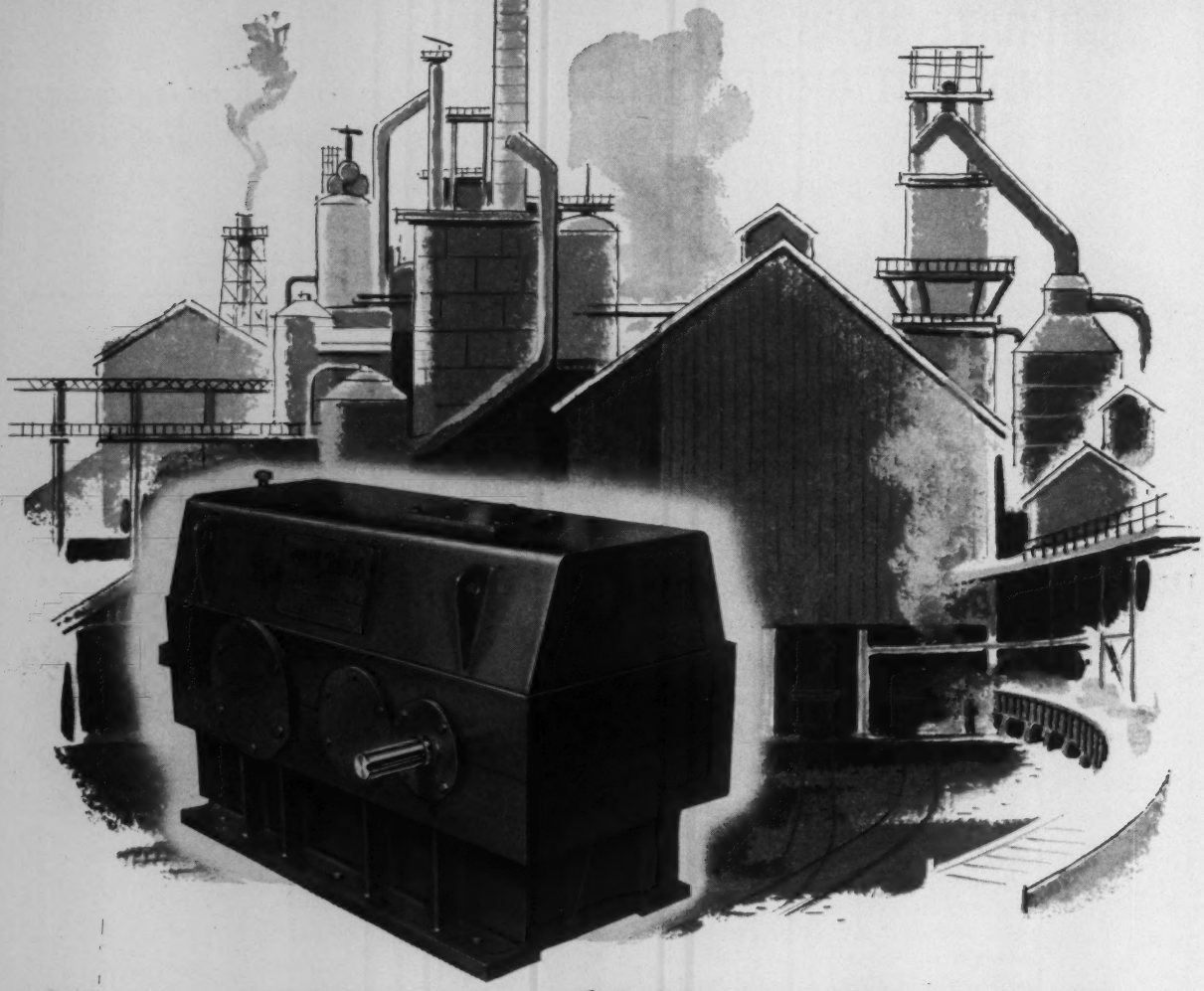
Foote Bros. Drives in the PRIMARY METALS INDUSTRIES



ALL STEEL *Maxi-Power...*

maximum performance drive in a tough steel housing

Add a functionally designed and carefully engineered, high strength fabricated steel housing to the basic heavy duty Maxi-Power Parallel Shaft Helical Gear Drive components, and you get a unit that is capable of resisting severe external impact, in addition to delivering maximum performance.

Maxi-Power Drives are found in the Primary Metals Industries wherever power demands are heavy, and operating conditions require the ultimate in strength, stamina and efficiency.

The heavy, precision machined steel bed of these drives keeps broad faced helical gearing in precise alignment to provide a smooth, overlapping mesh with close backlash tolerances. Tooth deflection is uniform under the heaviest loads. Heavy duty anti-friction bearings are conservatively rated to handle severest shock loads.

Maxi-Power Drives are available in nine combinations of shaft assemblies to permit a variety of gear drive arrangements between the prime mover and driven equipment. Maxi-Power Drives are available in Single, Double, and Triple Reductions. Standard Ratios are from 2.08 to 1 and up to 360 to 1. Capacities to 1550 HP.

Why not get the complete story on Maxi-Power soon? Write for Engineering Manual MPB and full details on the All Steel Drive today.

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POWER TRANSMISSION DRIVES

UNLIMITED MOUNTING POSITIONS

J. D. McLean, named president, Stromberg - Carlson Div., General Dynamics Corp.

U. S. Steel Corp., Michigan Limestone Div.—**C. H. Hogberg,** appointed president.

Alpha Metals, Inc. — **Harold Hertzog,** elected president; **M. A. Boyle,** named vice president, sales.

Union Carbide Consumer Products Co.—**J. F. Warnell,** appointed vice president, sales and **A. J. Adams,** vice president, production.

The Ohio Steel Foundry Co.—**G. D. Griffiths,** promoted to asst. vice president, roll sales; **C. L. Flanigan,** promoted to manager, Eastern roll sales; **F. B. Stauffer,** promoted to manager, Western roll sales.

The DeVilbiss Co.—**T. K. McGuire,** named a vice president.

Wagner Electric Corp.—**H. N. Felton,** named vice president, marketing and a director; **C. E. Widell,** named asst. vice president, marketing; **R. W. Boeringer,** named vice president, industrial relations; **H. S. Garrett,** appointed director, purchases.

Huck Mfg. Co.—**V. P. Burgess,** appointed vice president and controller.

Mississippi Valley Structural Steel Co.—**G. W. Schlutius,** elected president; **J. C. Arntzen,** named executive vice president, sales.

U. S. Steel Corp., National Tube Div.—**L. W. Mason,** appointed general manager, sales.

The Yale & Towne Mfg. Co., Yale Materials Handling Div.—**G. A. Tamblyn,** promoted to asst. general sales manager, industrial trucks.

U. S. Steel Corp., National Tube Div.—**A. W. Thornton,** appointed general superintendent Lorain Works.

Ansco, Div. of General Aniline & Film Corp. — **H. A. MacDonough,** appointed manager, product marketing.

A. P. Miller, elected president, Acme-Newport Steel Co., Newport, Ky.

Vickers Inc.—**J. H. Garwood,** appointed director, organization planning.

Link-Belt Co.—**P. W. Miller,** appointed sales manager, Caldwell plant in Chicago.

The Timken Roller Bearing Co., International Div.—**R. L. Frederick,** appointed executive director.

Kaiser Aluminum & Chemical Corp., Industrial Div.—**W. J. Edmunds, Jr.,** appointed manager,

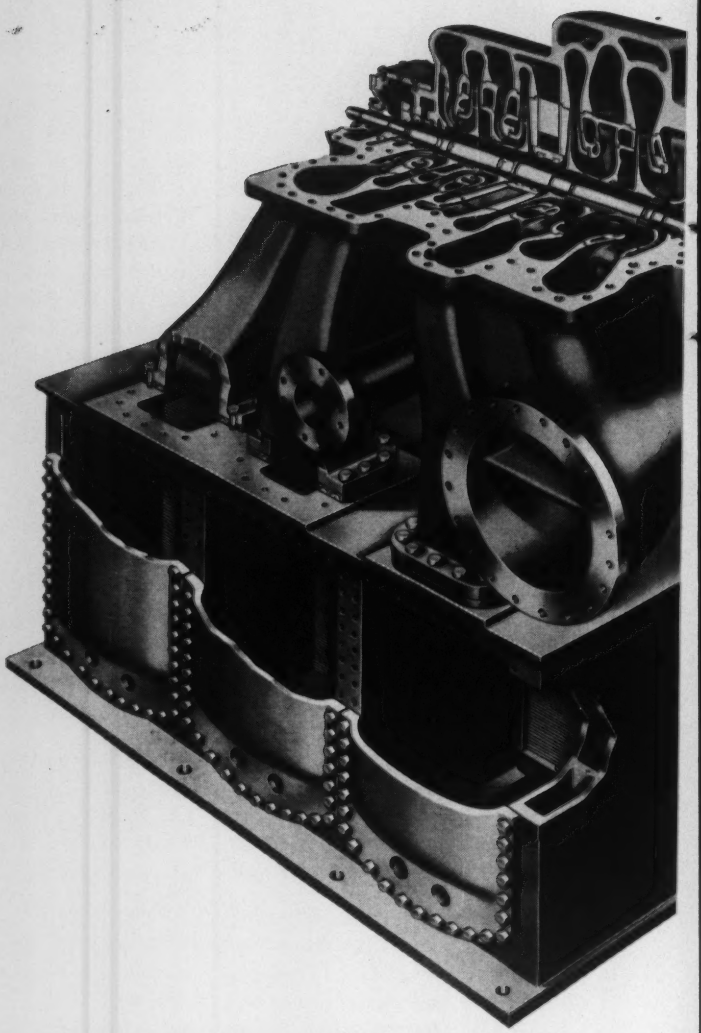
(Continued on P. 85)

T. W. Hunter, appointed general manager, operations-steel, U. S. Steel Corp.

R. E. Williams, appointed vice president, sales, National Tube Div., U. S. Steel Corp.

F. A. Dudderar, appointed general superintendent, Gary Steel Works, U. S. Steel Corp.

For OXYGEN PLANTS and other INDUSTRIAL AIR applications ...this new CLARK Centrifugal Compressor



High purity air is vitally important for the steel industry's new tonnage oxygen plants. While existing compressors could readily handle the service, economic considerations indicated the need for special high performance design.

The result is the new Clark Unatherm Centrifugal Air Compressor, a single case, four stage design possessing an unusually high hydraulic efficiency. To hold horsepower at a low level, the air stream is intercooled between each stage in base-mounted intercoolers. By mounting the compressors over the intercoolers, important savings in space requirements are realized. In addition to inherent compactness, the Clark design requires access to only one side for maintenance. The remaining three sides may be set flush against walls if required.

Another feature of the new Clark Unatherm Compressor is the use of back-to-back impellers to balance out thrust load. Integral bearing construction and single case design limit bearing and shaft sealing requirements to one at each end of the rotor and also eliminate alignment problems.

Being a simple rotative machine, normal maintenance consists of an occasional inspection. If ever necessary, however, the upper half of the case can be removed without disturbing bearings or breaking pipe connections.

In addition to providing primary air for oxygen plants, the Clark Unatherm Compressor is also an excellent choice for other industrial air uses requiring 110 psig air in capacities ranging from 5,000–38,000 cfm. They are ideal first stage compressors for wind tunnels or soot blowing because of their efficiency and air purity characteristics. The same advantages apply to base load, general industrial air applications where the complete absence of pulsation plus unusual compactness are also highly important features.

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(Continued from P. 83)

sheet and plate, and **R. F. Tighe,** named manager, extrusions and forgings.

Whiting Corp., Pressuregrip Div. —**G. F. Lytle,** named manager.

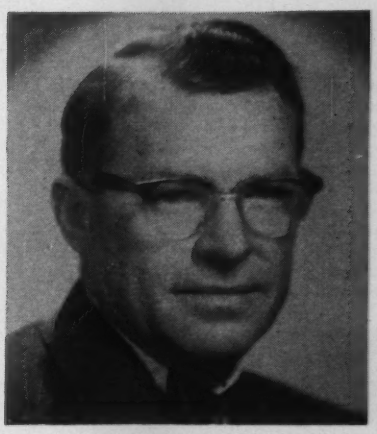
P. H. Devaney, appointed general manager, production, Jones & Laughlin Steel Corp.

Weirton Steel Co., Div. of National Steel Corp.—**F. J. Truesdale,** appointed manager, Service and Maintenance Dept.; **J. A. McConnell,** asst. manager; **V. V. Curtis,** as superintendent; and **G. M. Pearson, Jr.,** as asst. superintendent.

Dravo Corp., Engineering Works Div.—**W. H. Lehr,** appointed manager, equipment sales.

Veeder-Root Inc.—**J. D. Warfield,** appointed manager, marketing.

A. C. Keller, appointed works manager, Aliquippa Works, Jones & Laughlin Steel Corp.



J. J. Davis, named executive vice president, Electric Steel Foundry Co., Portland, Ore.

Heli-Coil Corp. — **Hiland Hall,** appointed assistant to the director, sales.

Johnston & Funk Metallurgical Corp.—**R. E. Retzler,** appointed assistant to the president.

Republic Steel Corp.—**D. J. Sullivan,** appointed superintendent, blooming and billet mills, Chicago steel plant.

J. H. Dunn, named manager, process development laboratories, New Kensington, Pa., Aluminum Co. of America.

C. A. Roberts Co.—**Harry Haas, Jr.,** appointed district manager, St. Louis warehouse and sales territories.

Borg-Warner Corp., Warner Automotive Div.—**A. K. Hahn,** appointed treasurer and comptroller.

STAINLESS STEEL IS USED IN LEADING EDGES of the 880's vertical fin and horizontal stabilizer where anti-icing is accomplished through electrical heating of the metal. Use of Republic ENDURO Stainless Steel increases strength and heat-resistance, permits thinner, lighter gages. Types 301 and 302 are readily formed into desired shapes by cold forming, drawing, and bending operations. Mail coupon for complete details.

IN EACH 880 POD-PYLON, rear engine mount "horseshoe" frame—of nickel-plated, chrome-alloy steel—grips the powerful General Electric CJ-805-3 engine. Republic Alloy Steels offer exceptionally high strength-to-weight ratios with the highest strength values. Uniform response to heat treatment assures complete deep hardening penetration, plus hard, wear-resistant surfaces. Send for additional information.

MAJOR 880 TITANIUM USES are (1) fixed outboard nacelle assembly—107.8 pounds per nacelle, 215.6 pounds per airplane; (2) lip assembly anti-icing nose cowl—53.8 pounds per nacelle, 215.2 pounds per airplane; and (3) right hand access door assembly—41.2 pounds per nacelle, 164.8 pounds per airplane. Republic supplies a major portion of the 870 pounds of titanium that goes into each Convair 880.

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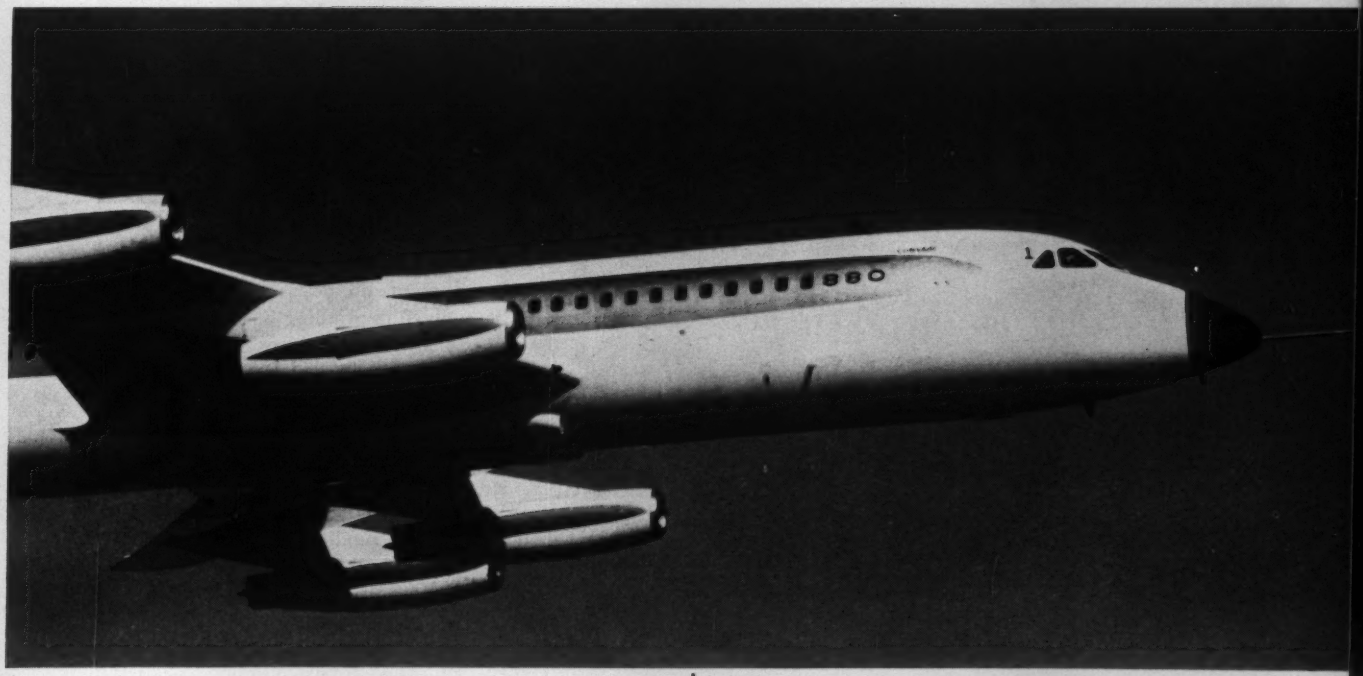
With constantly expanding research as well as production facilities and capabilities, Republic is the nation's largest producer of *high-performance* metals—titanium, stainless, and alloy steels. May we help you utilize these metals in your project? Return the coupon for complete information.



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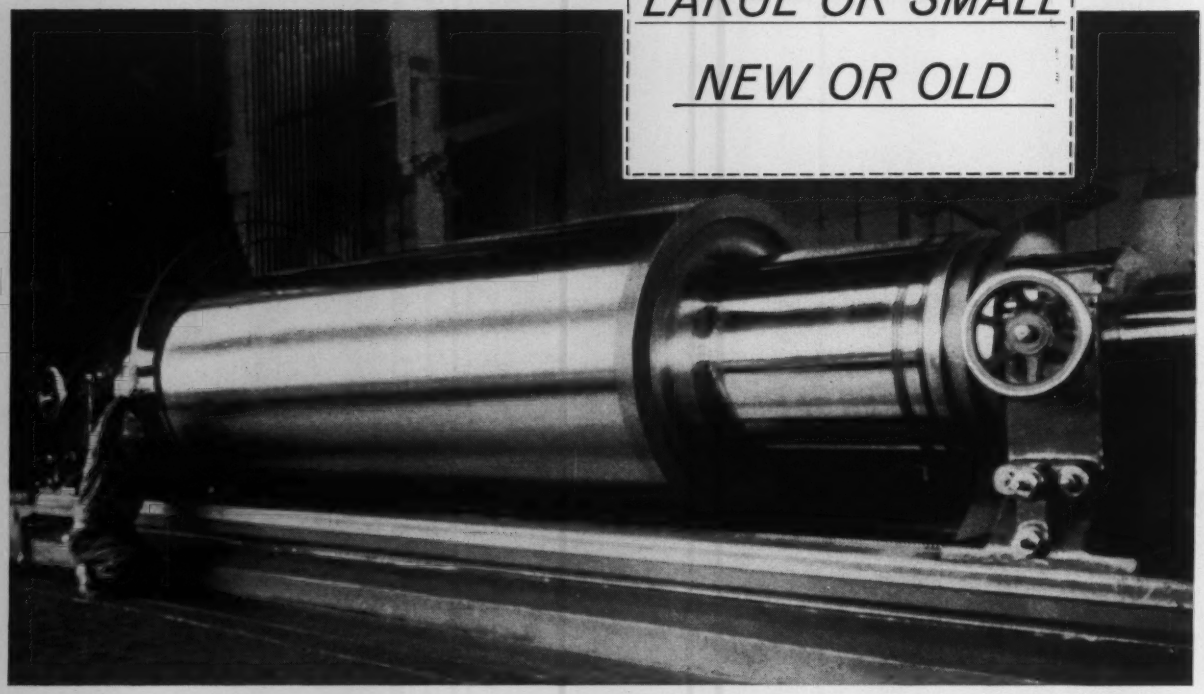

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Analysis and Planning Are Keys To Successful Transfer Lines

It pays to be thorough when you consider transfer lines.

It means looking into many small details as well as the major factors.

Cooperative teamwork between the plant and toolbuilder makes the difference in successful continuous flow setups.

By R. H. Eshelman,
Machinery Editor

■ Where do you start to mechanize a job? You might think it easiest to hand the part in question to one or more machine builders and let them come back with proposals.

But an outside engineer can seldom know all the specific problems and needs of the manufacturer. Engineers at Saginaw Steering Gear Div., General Motors Corp., Saginaw, Mich., believe, the more practical way lies in continued analysis and planning.

Cooperative Effort—This means close liaison with the machine builder. Perhaps this cooperative engineering approach accounts for Saginaw's reputation for success with continuous flow processing.

Its manufactured products are steering pumps, propeller shafts and steering linkages for GM auto divisions. Also included are all of GM's power and manual steering gears.

In addition, there's a line of ball screws and splines. Output of power steering pumps alone goes more than 1½ million units a year.

The big job is to maintain or improve product quality, while holding down unit costs. Engineers constantly struggle against rising labor and materials charges. A good case is how they analyzed and planned with Greenlee Brothers & Co., Rockford, Ill., an automatic transfer machine for processing hydraulic steering gear housings.

Holding Problem — Machined conventionally in a series of individual machines, the part poses many difficulties. It's a headache to locate and hold. Tight tolerances, interrelated, make it tough to hold scrap rates within reason.

Flatness and concentricity of surfaces are critical. For instance, the small end face must be held square with the thread pitch diameter within 0.003 in. total indicator reading. Also an end face within the cavity must be flat within 0.0005 in. and square with the axis of the cavity diameters within 0.002 in. TIR.

Similarly, two pilot diameters must be concentric within 0.003 in. TIR, and square with the side cover mounting face within 0.003 in. TIR at any point.

Transfer Helps — Many dimensional tolerances are equally exacting. Tally up these requirements, add in time and cost of handling

KEY IN CONTROL: Operator at control panel uses public address system to coordinate and speed operations, as conveyor lines handle blanks.

and inspection at individual machines and you have compelling reasons for going to a continuous-flow transfer line.

Other production problems included locating on the rough casting and marring of finished surfaces. One prime advantage, Saginaw Steering engineers found, when they first looked at transfer machining for the job, was that they could locate the part accurately in a rigid fixture.

Securely clamped in the fixture or pallet, the housing can be turned to completely machine all faces before releasing. Machining operations are performed in proper relation; marring of finished surfaces is avoided.

Be Practical — Planning operations start with the tool engineer lending a helping hand to the product engineer to make the design practical and producible. As planning progresses, they cooperate in determining what equipment would be best for the operation.

Meetings were held at Saginaw Steering and in the machine builder's plant. They discussed details such as better work holding arrangements, chip removal, coolant handling, provisions for banking parts, and detecting broken drills. Also considered were: installation, location and plant layout, conveyors, inspection, communications, cranes, tooling, spare parts, air and power supply, safety and maintenance.

Key engineers made visits to other plants to study installation problems, processing techniques, sources of breakdowns and tooling problems.

PARTS COME CLEAN: Enclosed wash station with heavy spray cleans up parts. Overhead bridge crane allows quick removal of covers.

STREAMLINE INSPECTION: Masters, air gages and preset blocks speed inspection of steering housings clamped in machining fixtures.

Study the Part—Company engineers start production planning with a careful analysis of the part. In fact a tool engineer is sometimes assigned to product engineering during the development period.

Close contact between product and manufacturing engineers also helps another way. Tool engineers, kept aware of pending product changes, can plan accordingly.

Mounting holes on Buick steering housings differ from Olds and Pontiac housings. By providing for drilling mounting pads on separate machines, the transfer line can still handle all BOP parts.

Mechanize What? — One big question always crops up. What operations should be mechanized and which are more economic to do manually?

For instance, how far will it pay to make loading and unloading automatic? Should clamping and unclamping be manual or automatic? How about deburring and cleanup of parts?

Finished components for hydraulic equipment, such as this steering unit, must be absolutely clean and free of chips and burrs

to preclude service troubles. So, you can find cleaning and deburring costs mounting higher than actual machining in conventional production.

Add Operations — In the first transfer line for housings, installed some time ago, automatic deburring was added after installation. It proves advantageous.

As a result, Greenlee engineers took it from there, improving the operation on the second machine. Now it uses rubber impregnated wire brushes running at high speed.

A planetary motion cleans up even the bell-shaped side cover mounting opening. An operator's station is provided for in-process inspection of deburring and cleaning.

Watch Chip Disposal — "Look out for trouble in chip disposal and coolant handling," warn Saginaw Steering engineers. Unless specifically provided for, these important details may be overlooked, or not adequately planned. On this part the 150 tools and 212 operations make some 3¾ pounds of chips.

To take care of this volume of metal, decision was to use a flood of coolant—some 2000 gpm. But this creates problems.

One of these is a wet floor. Plant engineers planned a depressed foundation with drainage for any spillover of fluid.

From past maintenance experience with chips and fluid blocking stops and causing malfunction of limit switches, they worked with the machine designers for another preventive measure. That's location of relay and limit switches out of the moisture zone.

Watch Inspection — It's well known that improvement in parts quality and consistency of production is one of the payoffs of such a setup. But operators and inspectors can get tired too. So even on mechanized processes methods experts study how to save motion and inspection time.

The divisional supervisor of plant engineering and methods makes this point: A savings of one second can mount to a tidy sum when you're talking production of a million pieces a year. Analysis took in handling, loading and unloading operations on the 17-lb part.

Similarly, inspection can often be reduced once mechanized operations are underway. Push-button transfer allows the inspector to pull a pair of pallets off the line at any time. Setup provides for complete in-process inspection outside the machine. In practice, they find they can maintain excellent control of quality by checking two pieces an hour.

Avert Downtime — One of the bugaboos of new machinery installations — downtime — can be minimized by preplanning. Broken tools, short tool life, malfunctioning of relays and other common causes can often be avoided.

For instance, on this machine line, only experience-proved cutters and tools are used. Also, tool gages are placed at each machine head to recheck preset dimensions before the tool man replaces a cutter.

But planning also can sharply cut the time an automatic line must be shut down for tool replacement or other cause. Here are some of these common-sense measures: Provide mechanized tool changes wherever possible.

Break up the line with automatic banking so segments can operate while other portions are repaired. Carry vital replacement parts in stock and make arrangements for sources of standard items.

Familiarize tool, maintenance and repair people assigned the line with electrical, hydraulic, pneumatic circuits and components. Provide for quick shut-off or fail-safe mechanisms to avoid big smash-ups.

How To Plan For Transfer Lines

1. **Study the part for mechanized production steps**
2. **Consider what operations should be mechanized**
3. **Analyze operator's jobs from methods, safety and human engineering aspects**
4. **Survey similar installations for sources of downtime and other troubles**
5. **Plan for parts replacement; establish supply sources in advance**
6. **Analyze tool changing and maintenance requirements**
7. **Schedule progressive steps of installation and design**
8. **Prepare for factory break-in period: train operators, inspectors, supervisors, maintenance crews**
9. **Assign best qualified production engineers to liaison with machine builder**
10. **Consider the project one of cooperative engineering with mutual responsibilities for success**

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

How Oriented Graphite Copes With High Heat Problems

Here's a material that conducts heat 500 times better along its surface than through it.

Called oriented graphite, the material offers many solutions to space age problems.

▪ Back as far as 1905, scientists were aware of the unusual properties of carbon deposited at high temperatures. But the phenomenon was no more than a curio in the lab. Industry had no use for the material in those days.

Now that we are in the midst of the space age, the picture has changed. The material is at last very practical. Where? In missile and nuclear reactor work or in any industrial field that makes use of high temperatures.

The Raytheon Co., Waltham, Mass., is now putting this high-purity graphite on the commercial market. It's called Pyrographite and withstands temperatures up to 6700°F. Even at such high heats, the material remains strong, chemically inert and impermeable to gases.

Pyrographite or oriented graphite has one outstanding property. It conducts heat 500 times better along the surface than through it. In fact, as far as surface conduction is concerned, oriented graphite outperforms copper or silver.

How About Graphite? — Early tests already reveal that oriented graphite holds an edge over conventional materials in nose cones and rocket motors. The thermoelectric properties of Pyrographite show promising use in electrical heating and cooling, too.

The new material may even replace conventional graphite as a moderator in nuclear reactors. Pyrographite, you see, has greater density and purity than common graphite.

Raytheon engineers see even wider avenues of use in the near future. For instance, fibers for thermal insulation and plastic strengthening. Oriented graphite, when combined with metals, may also provide new special alloys for industry.

To produce the material, Raytheon starts with a carboniferous gas; then deposits it molecule by molecule on a substrate. During this period, the crystal orientation is controlled.

Big Pieces — Whole pieces of Pyrographite can be produced by deposition on the inner surface of a graphite mandrel. It is then cracked apart and separated from the workpiece.

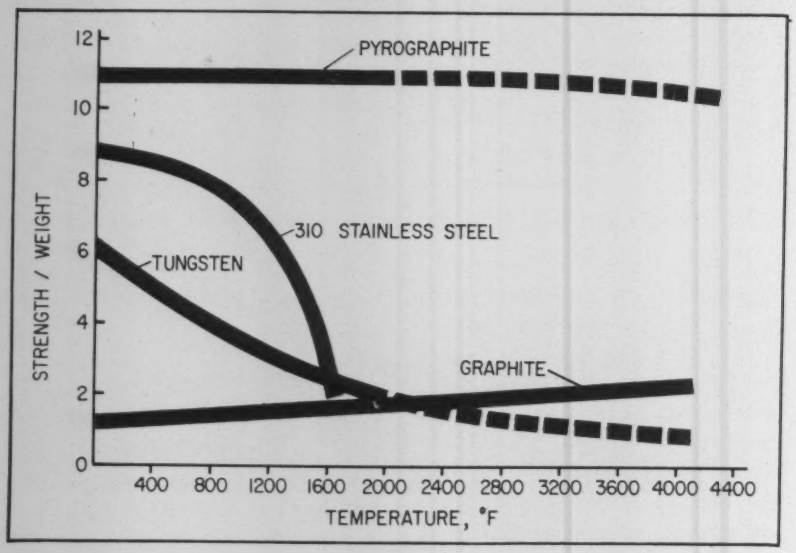
The fact that the material is impermeable to gases is most important for nuclear reactors. Tests with a mass spectrometer leak detector showed no signs of helium seepage. Pyrographite holds on to this vital property even after heating to 2500°C and re-cooling. It's evident in films as thin as 1 or 2 mils.

Raytheon expects to extend its new process to other materials such as Pyrographalloys, Pyrocarbides, Pyrocarbons and Pyrofibers.

For some time, graphite has been the choice as a moderator in nuclear reactors. The reason? Its high density and low atomic number. But oriented graphite is denser than conventional graphite. And it's pure to the state that no further purification is required. That should eliminate the threat of poisoning from impurities.

No Entry—As stated earlier, the material is impervious to gases. As such, when used as a coating, it can keep gaseous fission poisons out of coolant streams. Also, its high strength at elevated temperatures

Holding Strength Under Heat



points up its ability to contain pressures of fission products.

The high-temperature insulation properties of Pyrographite compare very favorably with other materials. It's very true when comparing oriented graphite with conventional solid thermal insulators. This is borne out by test results with arc plasma and rocket motors.

Complete electrical data are not yet complete. Initial results, however, do show similiar anisotropic properties in conductivity, both electrical and thermal. Resistivity along the layer planes is much less than for normal graphite. Across the layers it is far greater than for graphite.

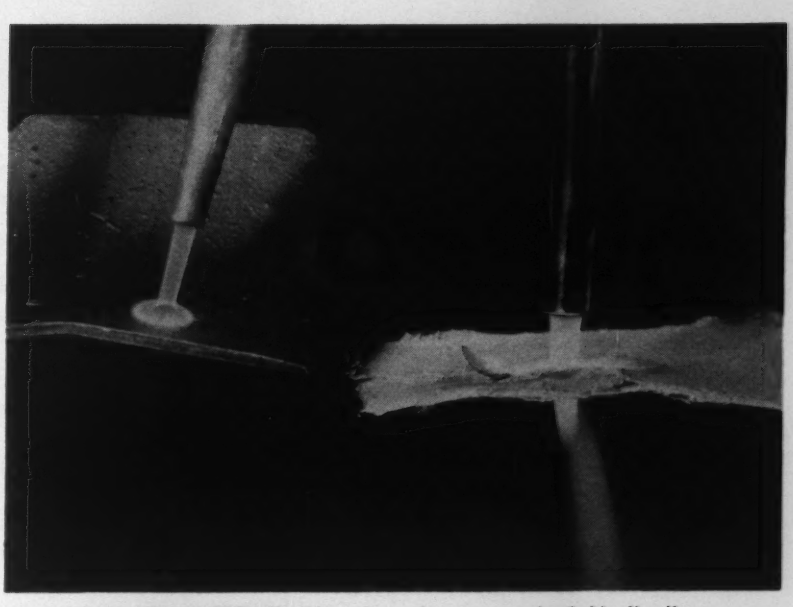
Compare the densities of oriented and normal graphite. The theoretical density of the latter is 2.26 g per cc. The common grades of commercial graphite run from 1.6 to 1.7 and densified graphites range from 1.7 to 2.0 g per cc.

Very Dense—Oriented graphite, on the other hand, has been prepared to measure as high as 2.22 g per cc. Density increases with temperature of preparation, due to a higher degree of crystallite orientation at higher temperature.

Pyrographite has a strength-to-weight ratio (along the planes) higher than Type 310 stainless steel at low temperatures. Above 2000°C, where normal graphite has one of the highest strength-to-weight ratios known, oriented graphite has a ratio fives times as great.

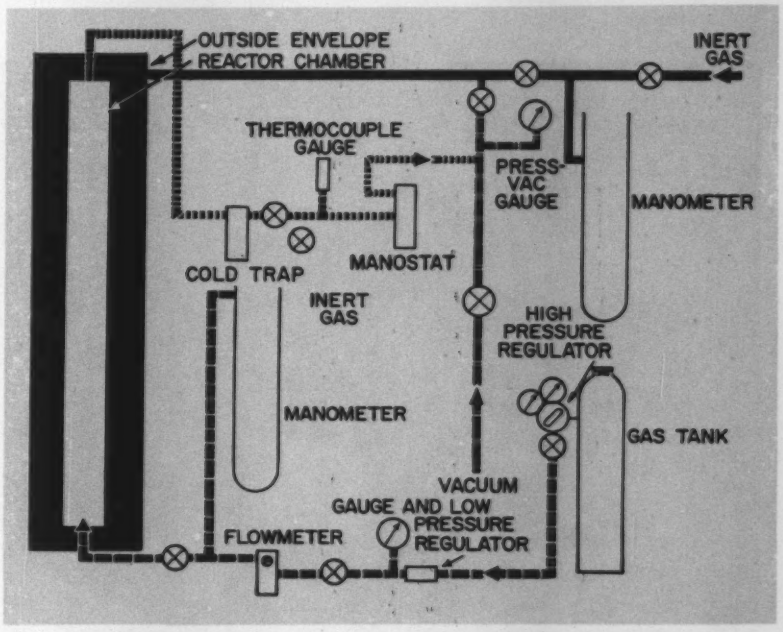
Many tests have been conducted with Pyrographite and normal graphite in highly-erosive atmospheres such as those produced by a high-velocity, high-temperature reducing stream of solids and gases.

Shows Up Well—The results of these tests put Pyrographite in a better light. It shows very little erosion. In contrast, graphite breaks down almost completely. This favorable comparison is due to the material's high degree of order in the crystal lattice. As a result, it presents low-reactivity basal planes to the gas stream.



HANDLES HIGH HEAT: Blast from butane torch (left) distributes over oriented graphite material. Same blast (right) pierces asbestos.

How Pyrographite Is Produced



For the past year and a half, Raytheon has been working on a program adapting Pyrographite to military use. Many studies have been made. They include structure of the material, the mechanism by which it's formed and its properties under various conditions.

Later studies include methods of manufacture and related materials which might be produced by similar techniques. Recently, Raytheon has turned over a successfully-prepared number of product samples to the Special Projects Office of the Navy Bureau of Ordnance.

Team of Corn-Base Binders Improves Foundry Cores

By Nicholas Kowall and Stanley Hadyn—Pratt & Letchworth Co., Buffalo

Corn-base core binders are of two major varieties. One increases green strength; another improves baked strength.

But when used as a team, foundrymen find that each binder helps the other do its job.

▪ Recent foundry practice shows that a pair of core binders is the key to improved core properties and performance. Made from corn, the team of binders complements and assists each other. Results: cores with better dimensional stability, improved surface finish, and higher scratch-hardness.

Pratt & Letchworth Co., div. of Dayton Malleable Iron Co., Inc., Buffalo, also reports savings from lower maintenance costs, faster baking time, and reduced maintenance of core-making equipment.

Green-Strength Binder — Mogul, a corn cereal, produced by Corn Products Co. has been used by Pratt & Letchworth for many years. It serves as a standard green strength binder—in green sand facing mixes as well as cores.

About two years ago, the foundry began working with another product from the same supplier, Dexocor—a corn sugar base baked strength binder—as a replacement for core oils.

When used together, the combination yields optimum core properties. Also, each binder helps the other do its job. For example, the Mogul, used mainly for green strength, retards migration of the Dexocor and results in uniform hardness of core interior. The Dexocor, in turn, aids green properties and permits a 10-25 pct reduction in the amount of Mogul used.

Tolerances Are Low — Baked properties of cores made with the corn binders are outstanding. Greater dimensional accuracy is an important feature of cores for railroad components because no machining is done on these castings.

Pratt & Letchworth actually achieves tolerances within plus or minus 1/64 in. With a scratch hardness of 90-100, workers easily handle the cores without any damage to the surface.

The new cores likewise produce castings with better internal surface finish. The hot strength developed in the cores reduces erosion by sand, and metal penetration; and there has been much less tendency for scabbing.

Can Redry Cores—Another unusual feature is the ability to put a rack of underbaked cores back in the oven. Formerly, once the cores were out of the oven, they could not be put back without sacrificing baked strength. Most of the core scrap loss resulted from the im-

ACCURATE DIMENSIONS: Molder checks tolerances of cores after insertion in mold. Foundry maintains dimensions within ±1/64 in.

possibility of drying oil cores.

The new cores, made with corn binders, can be returned to the ovens and redried to get full strength. Also, with the new cores, there is less chance for a defective casting resulting if they are not absolutely dry.

Ordinarily, cores are used soon after they are baked. In dry weather, however, cores made with the corn-based binders may be kept ten days to two weeks and used without difficulty. In one case, two cores made with the new binder materials were used after standing six months and still produced castings without surface defects.

Reduces Baking Time—Use of the new binder has reduced core baking time by 25-40 pct as compared with cores made from oil sands. The baking cycle for cores for draft gear castings ranges between 1¼-1½ hours when cores are made with the corn sugar binder. The same cores made with core oil bake in 2½-2¾ hours.

In addition to saving fuel, this substantial reduction in baking time suddenly became very important when the foundry recently installed a new four-station hydra-slinger.

This new equipment greatly increases capacity; but the increased rate of molding was handled without need for installing more core baking ovens, due to the faster drying rate of the cores made with Dexocor.

Eases Maintenance — Routine maintenance of core room equipment is easier since the changeover to the corn sugar binder. Formerly, when core boxes were put on the core blower, the oil residue hardened up in the vents, requiring cleaning or replacement.

Core oil residue also hardened in the core boxes. It was necessary to clean the boxes thoroughly before storing.

Now, that Dexocor is used, we find that washing with water alone easily cleans core boxes and equipment. When using oil, vent plugs blacken and have to be cleaned every sixth blow.

CHECKS SAND PROPERTIES: Technician uses dilatometer to check hot strength of test core. Compression and other green properties are also tested.

ALL USE CORN BINDERS: Sample group shows variety of cores made with corn binders. Much of the company's output is for railroad industry.

New Blast Furnace Design Boosts Iron Yields

Doubling the iron yield from a blast furnace is not impossible. Nor is it too costly.

All that it takes is an installation like this newly designed ultrahigh-pressure furnace.

■ During the past few years, steelmen have been besieged with reports of new iron-making processes. They are an impressive lot. (The IRON AGE, Oct. 8, 1959, pp. 114-118).

What will be the plight of the blast furnace? Opinions may vary, but one thing is certain. The new processes are not yet ready to displace the blast furnace as the main iron source for integrated American mills.

Moreover, a recent report by Owen D. Rice for Koppers Co., Inc., Pittsburgh, discusses an approach which may be a shot in the arm for the blast furnace. It is the ultrahigh-pressure blast furnace.

Not High Enough—As Mr. Rice points out, there has been much interest in deliberately imposed back pressure on blast furnaces during the past three years. The concept, however, rarely extends beyond 10 psi top pressure.

But what happens at pressures above that level? And what type of equipment is required?

In 1936, an article of great significance appeared in a German magazine. The author, Ernst Diepschlag, reported his experiments in passing carbon dioxide or hydrogen gas over lumps of red iron ore at various pressures and at several levels of temperature.

Gets Reduction Values—In each case, he measured the resulting percentage of iron reduction obtained in one-half hour. The first graph shows his findings.

Of particular interest are the lines based on values taken at 1112°F. This value is a good estimate of the blast furnace temperature at which reduction to iron by carbon dioxide takes place.

Note that "the degree of reduction increases quite rapidly up to three atmospheres absolute, and continues to increase, but less rapidly, as the pressure is increased further."

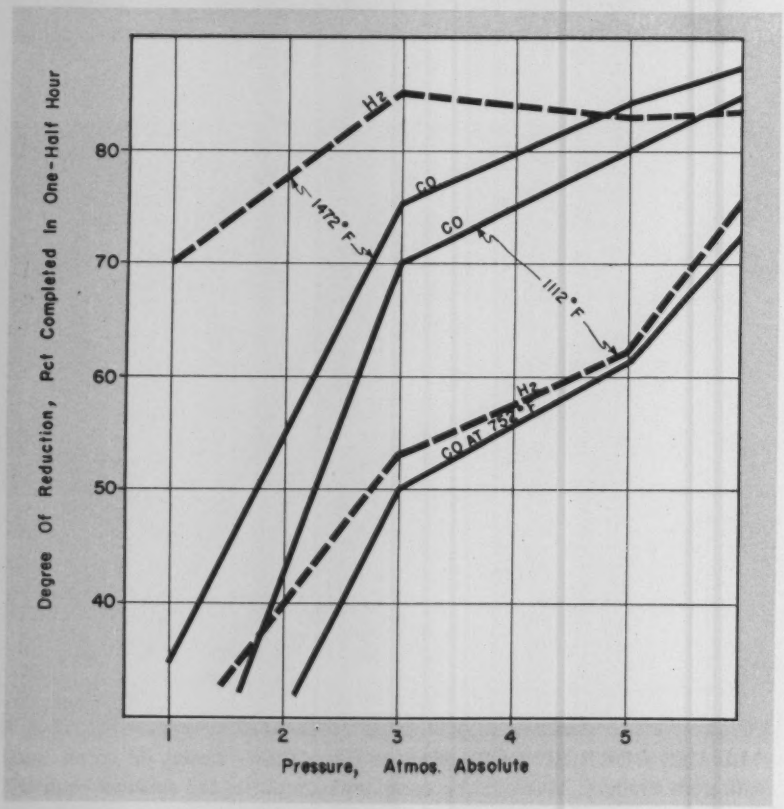
Moreover, "reduction rates are faster at higher temperatures but the rates of increase are about the same. Hydrogen does not seem to be as reductive as carbon monoxide, except, in the higher temperature ranges."

Converts to Top Pressure—The second graph makes use of the same data. But here absolute pressure has been converted into gauge readings of top pressure, and relative degrees of reduction have been calculated.

It shows that, at 40 psi gauge top pressure, the degree of iron ore reduction is easily twice as fast as at normal (50 in. water column or 1.805 psi gauge) top pressure.

Thus, if a furnace is charged with raw materials of such volume to

High Pressure Spurs Reduction



produce 2000 tons normally, then perhaps ultrahigh-pressure of 40 psi at the top might give a daily output of 4000 tons.

Need Special Equipment?—The problem now arises. How will this torrent of liquid and corresponding slag volume be handled?

Experience at the taphole is limited to the effect of passing through it a maximum of 500 tons at a cast. There are misgivings about casting larger amounts; making normal size casts at more frequent intervals is no good because it takes a certain amount of time for the taphole to season. So, two tapholes, each with its accessory equipment, are inevitable.

The furnace design is based on a 28-ft hearth diameter. The shell is continuous structurally from top to bottom. In order to avoid difficulty in containing large pressures within the furnace, there are no perforations for cooling elements except for the tuyeres and slag notches; shell cooling is entirely external.

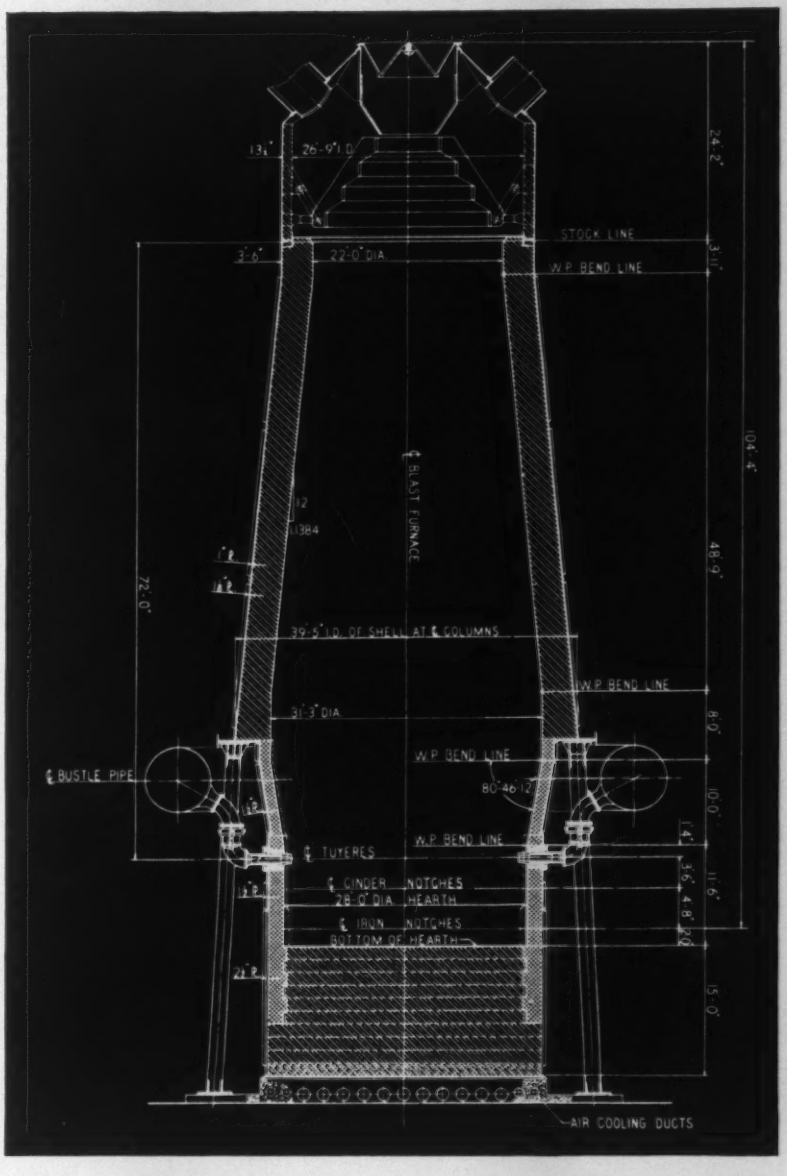
Change Bell Setup — A radical change is the filling device at the furnace top. Gone are the big bell and rotating distributor; two small bells act only as a gas lock.

It must be restated that this blast furnace is based on the use of all-beneficiated material; sinter (preferably limed), oversize lumps (not over 2 in.), well-screened coke.

There are indications that a combination of beneficiated materials and high top pressure lowers top-gas temperature to a point where moisture condensation may occur. This can be very annoying at a furnace top.

Reduces Furnace Height — One way to solve this problem is to lower the furnace height. Calculations show that a reduction of 10 ft will suffice. The drawing shows the dimensions of the new furnace. The greatest change is in the sloped inwall which has been reduced 7 ft to the new dimension of 48 ft 9 in.

Calls for Shorter Furnace



The handling of top gas at 40 psi calls for the most careful consideration. Power-actuated bleeder valves are oversize. There is one spring-loaded relief valve which opens automatically if the pressure regulating system fails to function.

The new gas-cleaning system serves a dual purpose. It is the back-pressure device responsible for imposing 40 psi upon the pressure top. At the same time, it uses the entire differential between 40 psi and the desired gas delivery pressure to clean the gas.

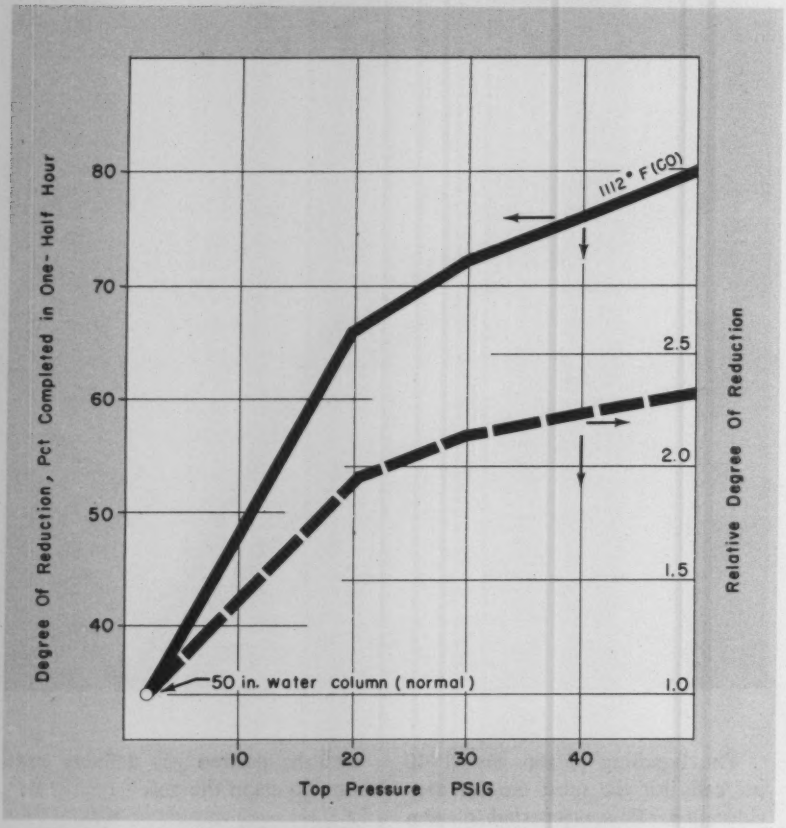
Uses Only Water — The system consists mainly of a series of orifice plates. They are arranged in the downtake gas main following the dust-catcher (which has been reduced to 30 ft diam). Water comes in above the uppermost orifice and passes with the gas successively through each of them.

Mr. Rice believes that no further measures are necessary or even ef-

Savings Soar with New Design

	One Normal-Pr. Furnace 2000 Tons/Day		One High-Pr. Furnace 4000 Tons/Day		Two Normal-Pr. Furnaces 2000 Tons/Day Each	
Annual Production	700,000 tons		1,400,000 tons		1,400,000 tons	
Operating Cost/Ton Pig		$43.66		$42.30		$43.00
Installation Cost	$12,000,000		$14,760,000		$22,000,000	
Capital Cost—Rate	23 pct		23 pct		23 pct	
—Per Year	$ 2,760,000		$ 3,490,000		$ 5,060,000	
—Per Ton Pig		$ 3.95		$ 2.49		$ 3.61
Total Cost Pig Iron		$47.61		$44.79		$46.61
Advantage in High-Pr.						
—Per Ton Pig			$ 2.82	$ 1.82		
—Per Year			$3,950,000.00	$2,550,000.00		
Greater Investment by:			$2,760,000.00	—		
Lesser Investment by:			—	$7,240,000.00		

Points Up Reaction Rates



fective; there is no need for electrical precipitators or disintegrators at the ultrahigh-pressure blast furnace. And he expects the cleaned gas to contain less than 0.001 grain of dust per cu ft.

The use of high pressures in this furnace means that other furnace accessories will have to be redesigned. Stoves, for example, are now built like pressure vessels.

Meet the Challenge — An even better example is the need for special blowing equipment. Engineers estimate that the typical blast pressure with 40 psi gauge top pressure, is about 55 psi gauge. Equipment, required for delivering the necessary amount of air, outstrips the largest facilities currently in use, says Mr. Rice. However, manufacturers are not hesitating to undertake its design and construction.

How do high pressures show up in actual blast furnace operations? Of some 76 blast furnaces studied, 16 work on deliberately imposed back pressure—about 8 psi gauge.

Comparison of Freyn ratings (the yardstick for gauging blast furnace operation) reveals a higher average for high pressure furnaces. The figures are 110 pct as opposed to 94 pct for the non-pressure furnace. And the ultrahigh-pressure blast furnace is expected to go at a Freyn rating of 200 pct.

Profits are Large—What about costs? Mr. Rice's report contains a detailed economic study which is summarized in the table. It shows that even though initial installation of the ultrahigh furnace is about 23 pct more than the normal furnace, there can be an advantage of almost $4,000,000 a year.

The future of the ultrahigh-pressure blast furnace is open to speculation. Nonetheless, several steel companies are showing interest in the design.

At present, a few furnaces are operating in Europe at top pressure of 25 psi gauge. It is likely that any step towards ultrahigh - pressure blast furnaces in the United States will also first work with pressures of that order of magnitude.

System Stacks Steel Quickly

Here's an automatic handling system that will move structurals and plate much faster from the rolling mill to loading docks.

■ A new material handling system is in operation at a midwestern steel mill. In essence, the method stacks up to one-third more tonnage than formerly handled by conventional setups.

As far as the mill is concerned, it means one thing: Customers will receive their orders that much sooner and in neater packages, too.

This automatic system is at work in the 20-in. rolling mill of Northwestern Steel and Wire Co., Sterling, Ill. Here, it conveys a variety of angles, channels, plate and wide-flange beams. Northwestern officials estimate that the system is capable of assembling up to 100 tons per hour of finished shapes.

The work-horses include a magnetic piler and an 84-ft span magnetic piling crane. Both of these units were designed and built by Birdsboro Corporation, Birdsboro, Pa. Electrically interlocked, these units are set up to provide for the nesting of structural shapes and the piling of plate.

Lifting Power — The overhead crane comes equipped with seven 2 ft 4-in. long by 13 13/16-in. wide magnets. The crane has a 99 fpm traverse and 76 fpm magnet lift. The piler, on the other hand, also contains seven magnets of similar size along with seven turnover devices.

In stacking angles and channels in reversing rows on the nesting bed, both the magnetic turnover device and the crane are used. Just the crane is used to convey beams to the table. The magnetic crane also moves plate. Of course, the turnover comes into play whenever final inspection is needed on both sides of the plate.

Depending on their widths, the setup can nest three to six pieces in a single row 2 to 2½ ft wide. Stack heights may range up to 1 ft. And forms can be handled up to 70 ft in length.

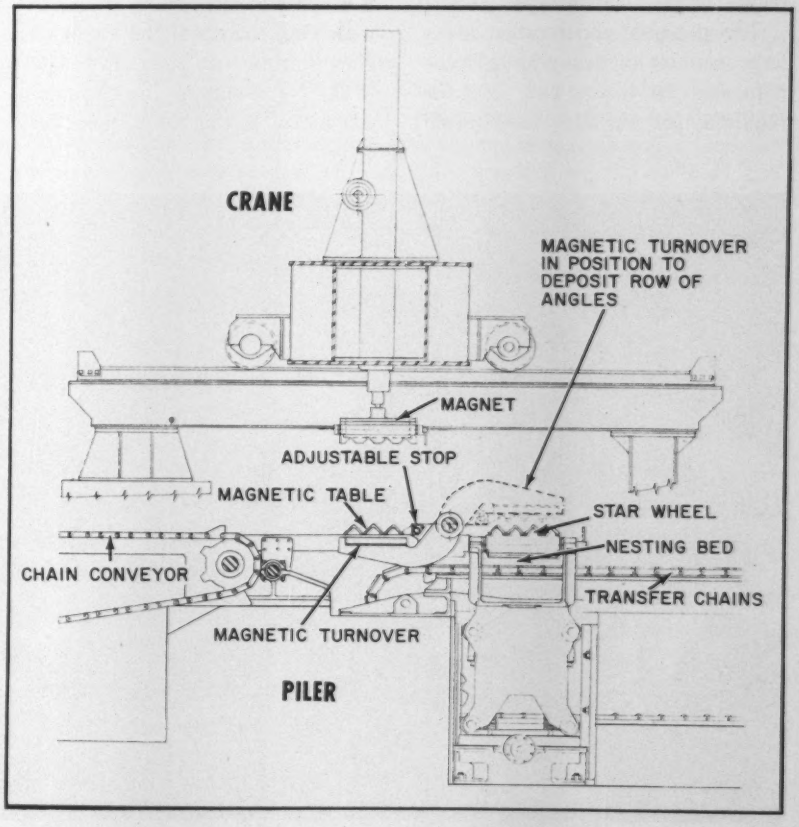
Widened Range — Northwestern used to pile its products in industry-standard five-ton lifts. Now, with the help of the piler, stacks are produced in lifts of almost any weight.

Final shapes are set down on shuffle bars. These pieces then travel to the piler's magnetic table where they butt against an adjustable stop. Next, the crane picks up a row of forms and sets them down on the nearby nesting bed. Their original position is not disturbed.

While the crane handles the first row of shapes, a second row is shuffled onto the magnetic table. The nesting bed compensates for each new row of shapes by lowering automatically.

As soon as the nesting bed drops to the preset level, the package is strapped and deposited on transfer chains. Then it moves to the loading dock. Both the piler and crane are designed for fully automatic operation.

How the System Works



MAGNETIC TEAMWORK: The three basic components of the stacking operation are the crane, the magnetic piler and the nesting bed.

Foundry Develops New Alloy For Heat Exchanger Tubes

By E. R. Hall—Research Metallurgist, Electric Steel Foundry Co., Portland, Ore.

The metallurgist often relies on special methods when he's on the trail of new alloys.

An Oregon foundry put its finger on the right stainless with a device that controls the amount of ferrite in the furnace.

▪ When a petro-chemical plant searches for the right heat exchanger tube, metallurgy takes over. Several problems were spelled out in an inquiry from one such company.

The potential order called for a large amount of heavy-walled centrifugally-cast tubes. The company required that the alloy used would not only have a fairly high resistance to corrosion but be fully weldable, too.

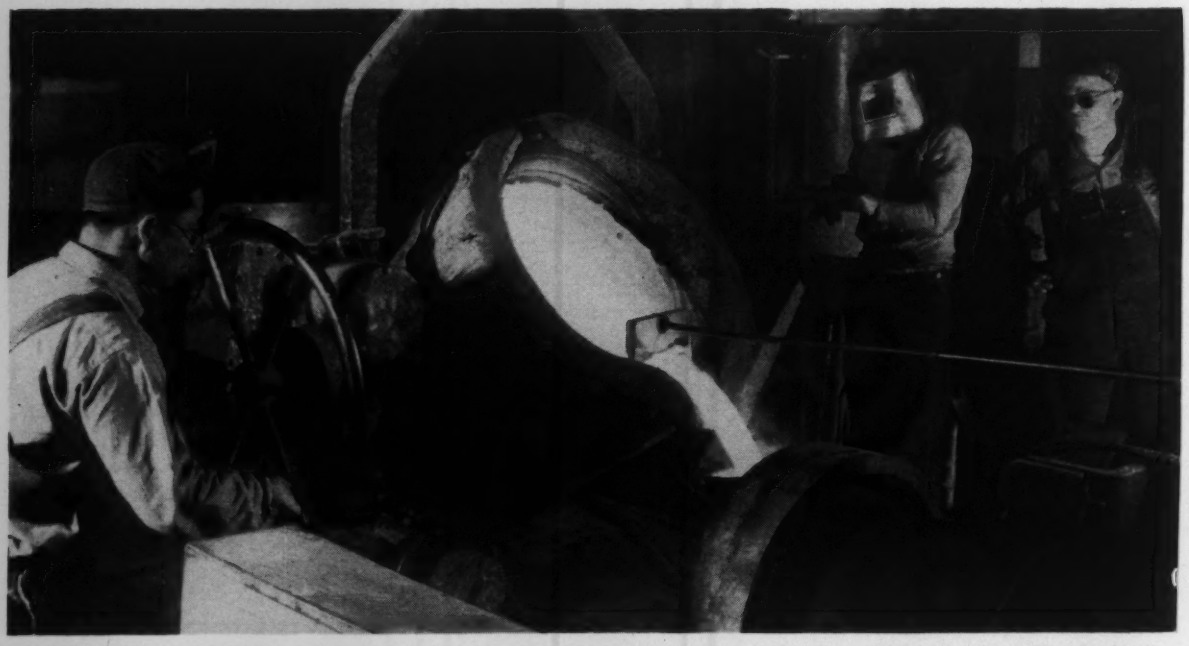
These tubes were earmarked for service where they would withstand operating pressures of 3000 psi at 700°F. The end user wanted the tube to meet these specs. Yet, it wanted a wall as thin as possible. Also, the finished castings were to be solution quenched, aged and welded with Type 316 ELC electrodes.

Making New Alloys—Engineers at Electric Steel Foundry Co., Portland, Ore., accepted the challenge. They started with their own Alloy 45TL. By modifying the chromium and nickel in this alloy, they were soon on the way to developing a new material, ESCO Alloy 44.

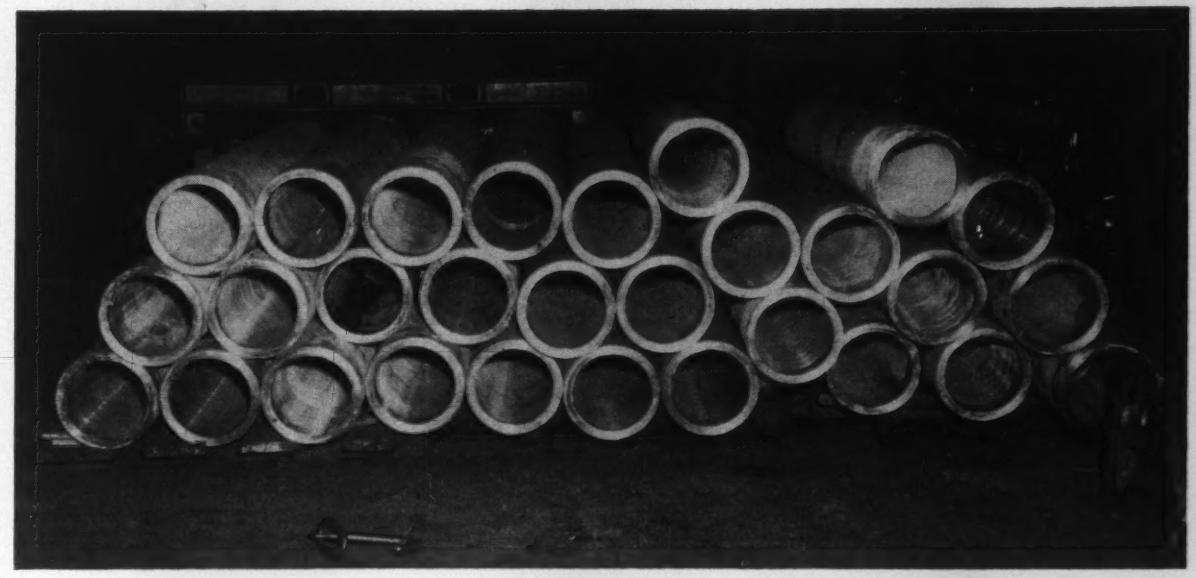
But the strength factor was still missing. So ESCO engineers used columbium as a stabilizer. Through proper heat treatment, it was felt that the very presence of columbium would supply the strength needed.

And it did. The treatment, of course, took into account the rate of sigma formation, and compromised both strengthening and embrittlement.

Only minor changes in chemistry are needed to vary the amount of sigma formed at a given temperature. So you must control each heat precisely to get consistency. Take



READY FOR CASTING: With the help of a new modified-stainless alloy, heat exchanger tubes are produced by centrifugal casting techniques. Finished tubes are used in a petro-chemical plant.



AWAITING SHIPMENT: Centrifugally-cast heat exchanger tubes await shipment to final destination. A new alloy helped promote the desired impact resistance and weldability needed to do the job.

the results of two identically-treated heats, for instance.

Sigma's Role—Both were solution quenched and held at 1550°F for five hours. But the amount and nature of sigma phase formed left one heat with a much lower impact resistance than the other.

The amount of ferrite present depends upon the relationship of the ferrite and austenite formers. Sigma phase forms more readily from ferrite. It was therefore obvious that ferrite had to be controlled.

But how can you tell how much ferrite will develop in the casting? At ESCO, one of its own engineers invented a technique (the subject of a patent) to solve the problem. It's a magnetic permeability indicator.

The new device, used at the furnace before tapping, insures that the desired ferrite content is obtained. Before this, they could only guarantee the chemistry range.

Ferrite, at Last—The result is ESCO Alloy 44. And it contains 5 to 10 pct delta ferrite. Chemical analysis and mechanical properties of this alloy are listed in the table.

ESCO engineers find that an increase in ferrite spells improved weldability. Early tests made with automatic equipment, using gas-shielded metal arcwelding, produced intergranular cracks in the base metal. Welding improved with the addition of ferrite content.

After ironing out some of the kinks, 90 heats were poured. Only eight of these were rejected. The foundry succeeded in increasing the alloy's strength through the formation of sigma. The toughness was reduced only slightly.

The customer now has its alloy castings. How do they stand up under fire? Not too long ago, the whole unit was down for thorough cleaning. Close inspection showed no corrosion on the ID's of the tubes. In fact, the original machining marks were still very distinct.

How Alloy 44 Rates

Chemical Analysis

Composition, pct

C – 0.03 max	P – 0.04 max	Ni – 12.0 to 13.0
Mn – 0.50 to 1.00	S – 0.04 max	Mo – 2.0 to 3.0
Si – 0.35 to 0.75	Cr – 17.5 to 18.5	Cb – 0.20 to 0.30

Mechanical Properties

Tensile strength, psi	71,500 to 76,500
Yield strength (0.2 pct), psi	42,750 to 48,250
Elongation (in 2 in.), pct	39.5 to 47.5
Reduction of area, pct	45 to 50
Brinell hardness	170
Impact, Charpy keyhole, ft-lb	24 to 39

New Cryogenics Research Puts Superconductivity to Work

Cryogenics is on the way to revolutionizing many facets of industry, including motors, computers and power equipment.

It may even help scientists view the tiny, elusive atom.

▪ Cryogenics—the study of strange behavior of materials in temperatures near absolute zero (—460°F) —has a long way to go. But top scientists agree that it holds the key to developments of great import to mankind.

Men are at work now at a new $100,000 lab solely devoted to cryogenics. It is part of the General Electric Co., Schenectady. Most of the work in the lab centers around Project Spin, a cryogenic gyroscope. GE has been working on this "cryogyro" for its own Ordnance Dept. under a contract with the Boston Ordnance District, U. S. Army.

The lab itself is equipped with six cryostat stations. Each one of them can maintain a temperature close to absolute zero. Individual stations have their own automatic control systems for setting and maintaining the helium-bath temperature.

Other features include piped-in gases and means for obtaining high vacuum under low temperature conditions. Another provides for the safe use of small quantities of liquid hydrogen, making the costlier liquid helium more economical. It also opens the door for tests at temperatures in a range above that of liquid helium.

SPINS FOR YEARS: GE engineer K. F. Schoch holds small sphere which, when set in motion, may be able to spin freely for years.

Cold World—Cryogenics lives in a world of its own. Temperatures are so low in this world that all molecular activity theoretically stops.

Life processes are suspended. And the materials living in this world take on strangely different traits.

Back in 1911, a Dutch physicist made a vital discovery. He found that the electrical resistance of certain metallic conductors disappeared when subjected to temperatures near absolute zero. In other words, the metals became "super-conducting."

For almost a half a century, the Dutch inventor's discovery went for naught. This was due to the problem of producing and maintaining the needed low temperatures.

Low temperatures are best produced by liquid helium. As late as 1940, however, only about a dozen installations in the whole world liquefied helium. It was a costly process.

Of course, more plants are producing the gas now. The cost of the process has been lowered, too. Another boon to the process has been a marked improvement in thermal insulations.

Tiny Spark—Several years ago, when the GE General Engineering Laboratory was engaged in computer work, a critical suggestion was made. Why not devise a superconductive element for use in computers?

Any answer to this question required further research into cryogenics. So GE engineers went after these answers in its own Research Laboratory.

And discoveries there were. A frictionless bearing was developed. The theory that magnetic flux will not penetrate a superconductor led to its discovery. By this means a sphere could be supported freely in a magnetic field.

By applying novel, superconductive motor principles, engineers could turn and operate the body as a frictionless motor with very low losses. GE then built such a motor that runs successfully at 20,000 rpm speeds for extended periods.

Other Uses, Too — Aside from developing the perfect gyro, the lab is also seeking useful cryogenic applications for many of its own operations. These include GE's Light and Heavy Military Electronics Departments, its Missile and Space Vehicle Dept., and its Computer Dept.

Where does cryogenics stand right now? It has advanced about as far as electricity did during the last half of the 19th century. But, according to J. F. Young, General Manager of GE's General Engineering Laboratory, "We are convinced that we are about to enter an era where developments of great importance to mankind will stem from application work in the field of cryogenics."

Digging a bit deeper, there are about 20 metals and many compounds and alloys, when surrounded by absolute zero temperatures, have no electrical resistance. A few of these metals are mercury, lead, tin, columbium and tantalum. Currents in a superconductive circuit flow forever, unless deliberately interrupted.

Current can be trapped in superconductive coils. They create magnetic fields that remain constant. And these currents will continue to remain constant unless there is a change in coil dimensions.

SPHERE DESIGN: J. F. Young (right), general manager of GE's new cryogenics lab, and K. F. Schoch examine precision design of the sphere.

Can't Get Through — Up to a certain strength, magnetic fields cannot penetrate superconductors. The fields induce permanent counter currents on the superconductor's surface. These currents repel the first field. So the superconductor assumes the role of insulator for magnetic lines of force.

A superconductor will become resistive if placed in a magnetic field of a certain strength. This is known as the critical field strength. Said value will vary according to the material and the temperature within the cryogenic range.

Alternating currents show some resistance. But this is only noted at high frequencies (about 10 megacycles). However, surface resistance and resultant losses in superconductors are still far lower than those of copper or silver at low temperatures.

The reason? Superconductors have super-electrons. They will not collide with the crystal lattice. Nor will they collide with normal electrons, even though normal electrons under ac conditions are prone to collide. Naturally, these collisions make up electrical resistance.

Where in the World?—From our present knowledge, how can cryogenics fit into our world? The example of sighting an atom

PERPETUAL MOTION: Use of liquid gases at low temperatures permits metal sphere to rotate at high speeds within a sealed vacuum.

through the lens of an electron microscope has sound basis.

Remember that superconductors shield magnetic fields. Therefore, by proper flux shaping, it could be possible to construct magnetic lenses with reduced lens errors. And this newly-resolved power could be enough to bring the tiny atom within focus.

The superconductive coil can be a handy standard of reference. Suppose the need arises to measure a given current.

Just conduct the current through the cryogenic surrounding. Then compare the current's magnetic field with that of the standard.

New Bearing—Frictionless bearings are possible, too. A proper coil arrangement and a "frozen-in" flux will enable superconductors to be suspended in space.

You can obtain high bearing stiffness. At the same time, you can eliminate mechanical wear. Such a bearing will work in a vacuum.

A cryogenic sphere can be turned by a rotating flux produced by a polyphase winding. A motor of this type would have almost 100 pct efficiency (ignoring losses in power supply).

These same superconducting bearing and motor principles will be a great asset in improving the accuracy of gyroscopes. The team of superconducting gyros and accelerometers along with cryotron computers should lend even finer precision to our future navigation systems.

Building Amplifiers — Another possibility is a superconductive dc to ac amplifier. One could be built that has no zero drift and no noise. A signal source would feed a control current into a lossless superconductive control winding.

A rotating superconductive disk would chop the flux from this winding. The disk itself would consist of segments that act as magnetic insulation. In a second winding an ac voltage and output power are produced.

Computer circuits can be built from combinations of cryotrons. These are simple tiny devices. They consist of a thin film gate wire influenced by a control wire. Both are superconductive. Current in the control wire creates a magnetic field. This destroys the superconductivity of the gate wire, making a two-position switch.

Cryotrons may spell smaller size computers and low power requirements. The entire computer is encased in a low-temperature setup.

Search Is On — At present, the entry of cryogenics into the power field would be too costly. This, of course, is due to the very high cost of maintaining such low-temperature equipment. But find the material that will become superconductive at the temperature of liquid nitrogen. Then see the cost picture change.

Discovery of such a material would throw the door wide open to superconductors. They could act as special transformers, generator stator windings, the coils of big particle accelerators and large coils for energy storage and discharge systems.

Resonant cavities with very little damping are also possible with superconductors, because of their small surface resistance at high frequencies. Frequency standard oscillators using such cavities could be almost as accurate as atomic clocks.

At low temperatures the mechanical stability of a resonant cavity is very high. Why? Because metals don't creep, expand or contract under such conditions.

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Photo of Atlas missile courtesy
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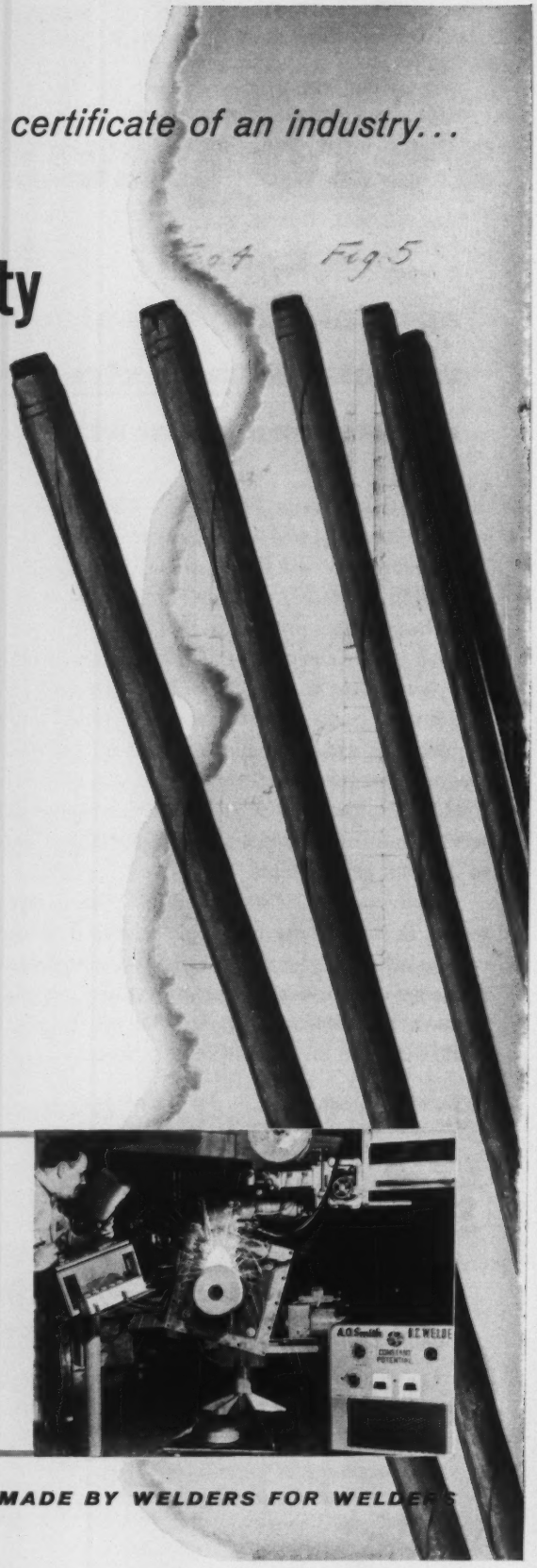
Birth certificate of an industry...

This invention had two mothers...necessity and A. O. Smith



OUT OF NECESSITY BY A. O. SMITH is the way the idea of a paper-wrapped electrode was born. Necessity appeared on the scene in 1918 when German U-boats cut off the importation of asbestos-covered electrodes — electrodes desperately needed in the fabrication of aerial bombs. The need was for an electrode covering which made welds strong and *ductile*.

ENTER A. O. SMITH TO CREATE A NEW INDUSTRY— An A. O. Smith research team found the answer in an electrode with an arc-shielding wrapper of fireproofed (sodium silicate) paper. Here was a weld that was discussed around the world — an efficient (at the time) and economical electrode that not only solved a specific armament problem, but turned a primitive steel-splicing method into the world's most useful metalworking technique.

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A. O. SMITH WELDING ELECTRODES ARE MADE BY WELDERS FOR WELDERS

UNITED STATES PATENT OFFICE.

REUBEN STANLEY SMITH, OF MILWAUKEE, WISCONSIN.

ELECTRODE FOR ARC-WELDING.

1,301,331. Specification of Letters Patent. Patented Apr. 22, 1919.

Application filed December 6, 1918. Serial No. 265,524.

To all whom it may concern:

Be it known that I, REUBEN STANLEY SMITH, a citizen of the United States, residing in the city of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Electrodes for Arc-Welding, of which I hereby declare that the following is a full, clear, and exact description, such as will enable persons skilled in the art to which this invention pertains to make and use the same.

[illegible] electrodes for [illegible] such a [illegible] by [illegible] which [illegible] the [illegible] the [illegible] the

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 111.

Proximity Switch

Information concerning a proximity switch—a device which senses ferro-magnetic material without physical contact—is available in a four-page data sheet. Included are photographs, dimension drawings, descriptive diagrams of sensitivity range, sensitivity envelopes, mounting requirements, wiring instructions, operating and electrical properties, prices and other helpful data. (Micro Switch, Div. of Minneapolis-Honeywell Regulator Co.)

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Refractory Metals

The reactive metals, tantalum, titanium, and zirconium, are explained in an eight-page bulletin in terms of process characteristics, fields of application, and types of standard and custom equipment available. (The Pfaudler Co.)

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Demineralizer Unit

A new line of standardized packaged mixed-bed demineralizers is fully covered in a four-page bulletin. Designed for process water applications, the size of the new unit ranges up to 13,200 gph. Information, concerning the use of demineralization process eliminating variables in water and their effects on product quality control, is included. (Cochrane Corporation)

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Gate Valve

Full description and illustration of the use of nylon disks as seats in gate valves is obtainable in a new two-page bulletin. It contains engineering information and specifications, accompanied by a chemical recommendation chart. (OPW-Jordan Corp.)

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Induction Heating

A new 12-page issue is now available, featuring subject matter on the floating zone method for growing germanium or silicon crystals; zone refining and zone leveling, with information on coil design and construction. (Lepel High Frequency Laboratories, Inc.)

For free copy circle No. 5 on postcard, p. 111

Detect Pressure Leaks

Manual and automatic detection of leaks in aerosol bombs, fire extinguishers and other pressurized containers is explained, with illustrations, in a short brochure. (General Electric Co.)

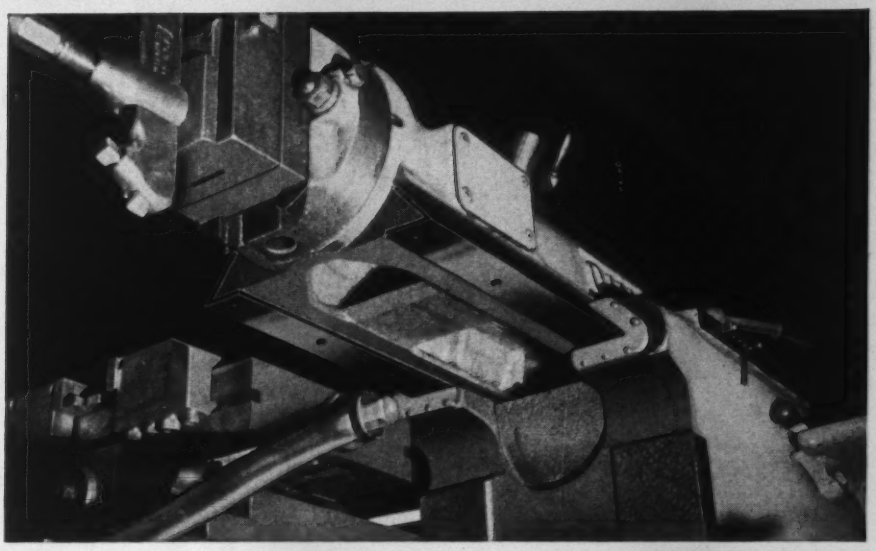
For free copy circle No. 6 on postcard, p. 111

Variable Speed Belts

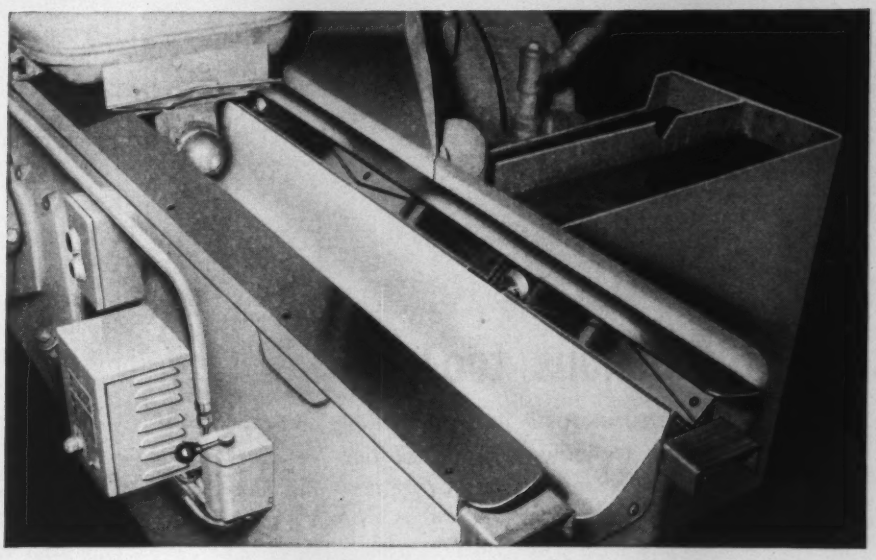
Ratings, sizes and engineering data appear in a 32-page selection guide for variable speed belt users. Other handy information includes

WEAR PLATES

ANOTHER *Lamina* BRONZE-PLATED PRODUCT



Lamina bronze–plated wear plates used on shaper ways.

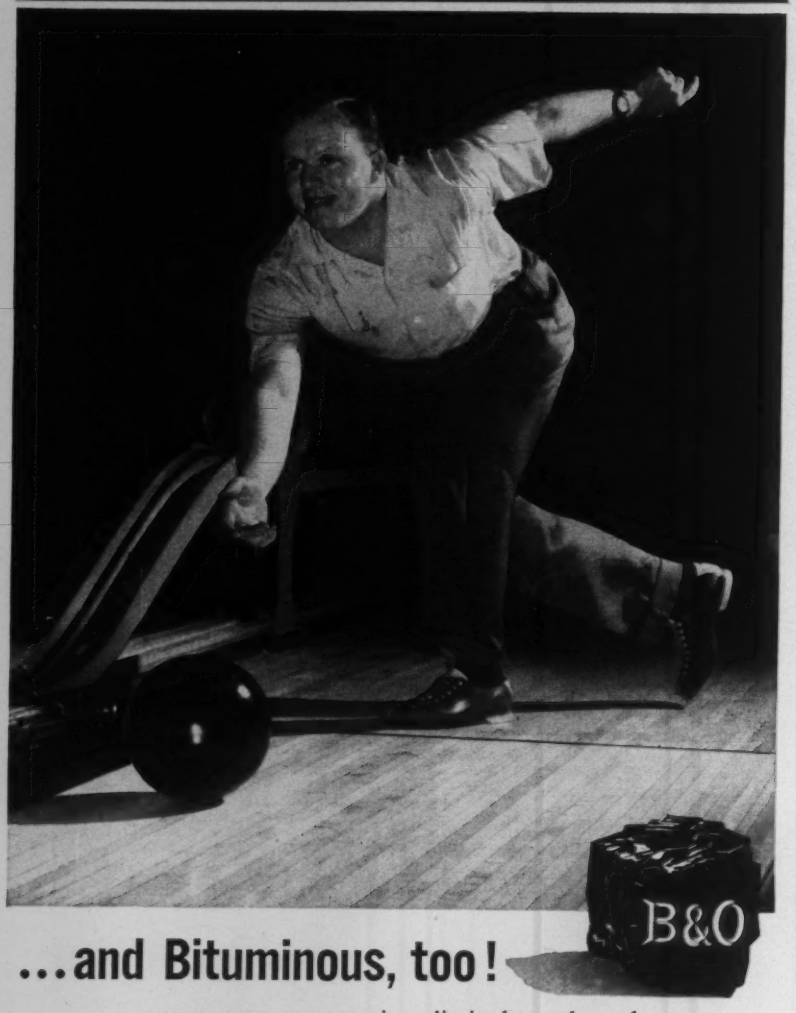


Lamina bronze–plated wear plates used on grinder ways.

Lamina bronze-plated wear plates and their many uses are completely described in Bulletin WP-58. Send for your free copy.

Lamina
DIES AND TOOLS, INC.
P.O. BOX 31, ROYAL OAK, MICHIGAN
Phone: JOrdan 6-8711

IT'S *what's behind*
THE BALL THAT COUNTS!



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BEHIND BITUMINOUS is unlimited supply and ever increasing technology of utilization. *No other usable power source is backed by both these important characteristics.*

You can base your constant power-fuel needs on bituminous with confidence—B&O Bituminous, of course! ***Ask our man!***

BALTIMORE & OHIO RAILROAD, BALTIMORE 1, MD., PHONE: LEXINGTON 9-0400

FREE LITERATURE

an alphabetical listing of applications; numerical listing of manufacturer's part numbers; and variable speed cross reference tables. (Maurey Mfg. Co.)

For free copy circle No. 7 on postcard, p. 111

Foundry Shell Cores

Shell cores for fast, economical mass production of resin coated sand cores can be used in both ferrous and nonferrous operations. They are also used in conventional sand molds, shell molds and in permanent molds. A bulletin provides detailed instructions, diagrams and parts lists. (Dependable Shell Core Machines Inc.)

For free copy circle No. 8 on postcard, p. 111

Cylinders

A detailed description of a line of air, water and oil cylinders and valve-cylinder combinations for automation applications is presented in a 24-page bulletin. The bulletin supplies specifications, dimensions, outstanding features and ordering information. (Airmatic Valve, Inc.)

For free copy circle No. 9 on postcard, p. 111

Accurate Estimates

To encourage greater accuracy in estimating weights of cast aluminum parts, a 16-page booklet features a profile on the procedures employed in computing weights which are the basis for firm quotations by leading foundries to purchasers of these products. (The Aluminum Association)

For free copy circle No. 10 on postcard, p. 111

Roll Feeds

An informative 16-page bulletin contains illustrations and descriptions of rack and pinion roll feeds for OBI presses. Illustrations show feeds in operation position on various standard punch presses. Included is a specification chart for use in roll feed selection. (F. J. Littell Machine Co.)

For free copy circle No. 11 on postcard, p. 111

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Fire Equipment

Hand portable extinguishers, stationary fire equipment, piped systems and large capacity mobile units such as fire jeeps and trucks are included in a catalog. Pictures explain how to use and how to recharge extinguishers. (Write on letterhead to Ansul Chemical Co., Marinette, Wis.)

For free copy circle No. 21 on postcard

Coolant Filters

Fabric filters and combination magnetic and fabric filters are illustrated and described in an eight-page bulletin. These filters remove sludge from coolant in grinders, gear shavers, automatic screw machines, broaching machines, super finishers, milling machines and thread rolling equipment. (Barnes Drill Co.)

For free copy circle No. 22 on postcard

Protect Galvanizing

The most effective techniques for painting galvanized steel are explained in a booklet. Painting extends the period of protection provided by the zinc coating and can increase heat reflection and improve appearances. (Committee on Galvanized Steel Sheet Research, American Iron and Steel Institute)

For free copy circle No. 23 on postcard

Surface Finishing

Step by step procedures for the abrasive finishing of solid copper stampings, castings, extrusions, and spinnings are offered in a new data sheet. Also included is data referring to satin finishing, high color finishing and recommendations on wheel heading, lubrication, surface speed and type of buff. (Lea Manufacturing Co.)

For free copy circle No. 24 on postcard

Immersion Heaters

Fast, accurate heating for melting of soft metals at temperatures up to 950°F is provided by a line of electric heaters. The bulletin presents the various models available, along with complete information on selection of the proper type and capacity heater for different types of metals and heat-up time. (Edwin L. Wiegand Co.)

For free copy circle No. 25 on postcard

Thermal Elements

The origin, operation, and description of the snap-action disk type thermal element is offered in a 29-page booklet. The publication reports how the disk actuates Klixon thermostats, circuit breakers and a recently developed line of inherent overheat protectors. It also outlines hot disk-actuated controls, such as motor starting relays, precision switches, and Klixon thermal valves. (Metals and Controls, Div. of Texas Instruments, Inc.)

For free copy circle No. 26 on postcard

Motor Reducers

A 28-page catalog covers motor reducers for use with blowers, compressors, conveyors, cranes, hoists, elevators, machine tools, rotary mills, mixers and stokers. (Philadelphia Gear Co.)

For free copy circle No. 27 on postcard

Coolers and Dryers

Basic drying principles as well as illustrations, specifications and material weight charts are included in a 32-page booklet on electrical and mechanical vibrating coolers and dryers. (The Jeffrey Mfg. Co.)

For free copy circle No. 28 on postcard

Flame Cutting Machine

Suitable for straight line and shape cutting on 8-ft steel plate, a flame cutting machine is discussed

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **1/28/60**

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FREE LITERATURE

in detail in an eight-page catalog. Design, construction and operation of the machine is explained. (Air Reduction Sales Co.)

For free copy circle No. 29 on postcard

Filter Pumps

An informative filter pump selection guide is included in an eight-page brochure. Data and facts about the various components and materials of construction incorporated in the filter units to achieve optimum depth filtration are listed. (Sethco Mfg. Co.)

For free copy circle No. 30 on postcard

Nickel Anodes

Less scrap loss per anode and longer runs between replacements are described in a bulletin. The new-shape nickel anodes provide longer running time; thus cutting labor costs. (Hanson-Van Winkle-Munning Co.)

For free copy circle No. 31 on postcard

Print on Plastics

For continuous repeat printing of lettering or design on plastic tubing of various diameters, a completely enclosed printing machine provides exactly the right amount of ink for a light or heavy impression. (The Acromark Co.)

For free copy circle No. 32 on postcard

Manufacturing Program

A German bulletin illustrates world-wide construction and planning of steel bridges, steel buildings, blast furnaces, rolling mills, industrial plants, large conveyors and other heavy equipment. (Fried Krupp)

For free copy circle No. 33 on postcard

Electronic Amplifier

An electronic servo amplifier and power supply for use in ac-instrument servo systems is described in a technical data sheet. The amplifier offers high sensitivity and stable operation by using feedback techniques and ruggedized, industrial electronic tubes. The power supply has passive, long-life components and built-in indicating lights that facilitate maintenance. (Seneca Falls Machine Co., Electronics Div.)

For free copy circle No. 34 on postcard

Voltage Regulators

Use of single phase line voltage regulators to accomplish effective voltage regulation in three-phase circuits is the subject of a bulletin. Phase-shift relations between input and output are discussed, with laboratory tests described. (Sorensen & Co.)

For free copy circle No. 35 on postcard

Carloading Charts

Check charts for freight carloading are available to assist shipping room and loading dock personnel. The charts provide clear, simple illustrations and instructions for preparing and draping the car. Use of strapping tools is also covered. (Signode Steel Strapping Co.)

For free copy circle No. 36 on postcard

Wet Abrasive Cutter

Designed for trouble-free service under severe working conditions, an oscillating-wheel, wet abrasive cutting machine slices hardened steels and corrosion-resistant alloys. (Allison-Campbell Div., American Chain & Cable Co., Inc.)

For free copy circle No. 37 on postcard

Air Operation

The schematic sketch on the inside front cover of a 24-page bulletin features layout of air operated products. The products, described in detail, include filters, regulators, lubricators and drains. (Wilkerson Corp.)

For free copy circle No. 38 on postcard

Magnetic Tape

A four-page bulletin describes a magnetic tape for digital and analog recording. Performance qualities, production techniques, and specifications are all included. (Consolidated Electrodynamics Corp.)

For free copy circle No. 39 on postcard

flowability

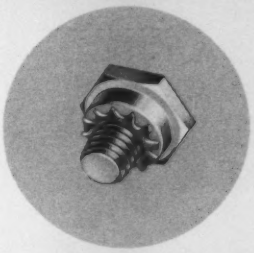
MAKES THE DIFFERENCE

The specially shaped Nibs under the head of this Shakeproof® Thread-Cutting Screw are designed to act as torque brakes. As the screw is driven, the Nibs make contact with the work surface and "eat up" excessive driving torques. This prevents stripping the threads from over-tightening and also permits a broader range of driver settings.

For effective braking action, each Nib must be sharp and precisely formed. So, material must flow deep into the die cavities to fill out each Nib. Keystone XL Wire does the job—uniformly, consistently and precisely.

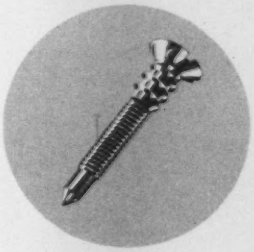
There are many other examples of how Shakeproof puts the *flowability* qualities of Keystone XL Wire to good use, increasing production and quality. If you'd like to learn more about these qualities, call your Keystone representative. Our metallurgists are at your service.

Keystone Steel & Wire Company, Peoria 7, Illinois



Sems-by-Shakeproof—5⁄16 diameter head plus shoulder makes this a good example of the *flowability* of Keystone XL Wire.

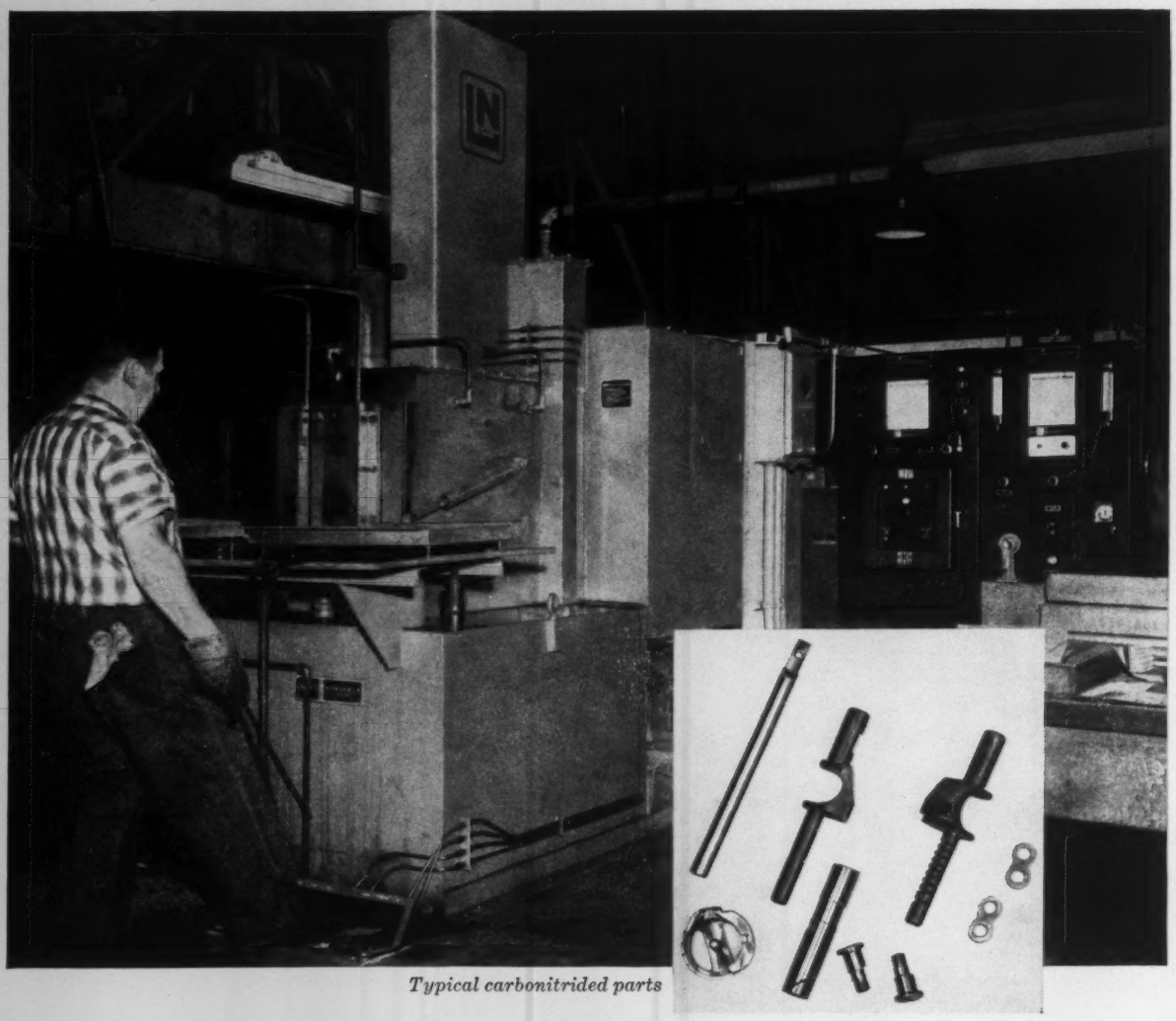
Mounting Screw combines left- and right-hand threads on the same shank as well as Nibs under the head. Left-hand thread and extruded lower thread section make this an exacting job.



KEYSTONE XL WIRE STUDY

KEYSTONE

WIRE FOR INDUSTRY



Typical carbonitrided parts

"Here at Singer we're not only saving money on cyanide salt . . .

but on handling costs formerly required to string up each part individually." So says the Heat-treat Manager of the Singer Manufacturing Company's plant at Elizabeth, N.J. where a new L&N Tricarb furnace was recently installed. "As yet," he says, "we can't give any exact cost figures. We've just been running parts and checking them through Quality Control. But we know our cost per part has really dropped."

At the present time, Singer is carbonitriding various sewing machine parts made of SAE 1010 to a case depth of 0.008" to 0.015" at 1550 F for ½ to ¾ of an hour at temperature. The cycles are fast and the work comes out of the protected atmosphere quench clean and bright.

The Manager points out that, "Once these parts are okayed by Quality Control we plan to do case carburizing and homogeneous carburizing in the same furnace. With Microcarb control we can tell exactly what we're doing and where we are. We bought this furnace as part of a quality control and reduced cost program . . . it's the most precise heat-treating tool we could find on the market. It's a natural for handling the variety and caliber of work we have to turn out."

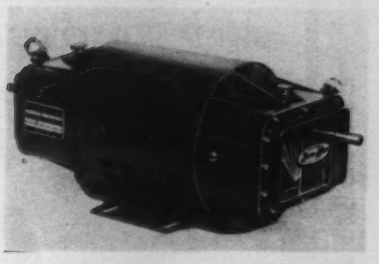
If you, like Singer, must heat-treat a myriad of parts . . . need versatility and precision control . . . it will pay you to investigate this Tricarb furnace. It is a complete heat-treating package with integral quench and direct and continuous temperature and carbon control. In just one furnace you can now do controlled surface carburizing, carbon restoration, hardening, homogeneous carburizing or carbonitriding.

For more information *ask for Folder T 620(17).*
Just write us at 4956 Stenton Avenue, Philadelphia 44, Pa.
or call your nearest L&N office.

LEEDS Instruments **NORTHRUP** Automatic Controls • Furnaces

New Materials and Components

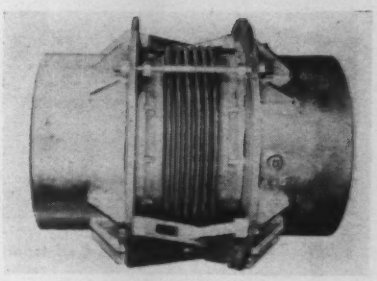
One Motor Drives Two Operations



Independent speed control over two separate operations is possible with one operator. Two simple levers on one motor can be operated simultaneously. The motor consists of a ⅓ hp, double shaft unit with variable 0-400 rpm speed. Rotation in either direction to the full speed range on one or both ends of the motor is featured. Available with torque ratings at each output shaft of 10, 15, or 20 in.-lb, gearheads can increase the torque limit. (Zero-Max Co., Div. of Revco Inc.)

For more data circle No. 40 on postcard, p. 111

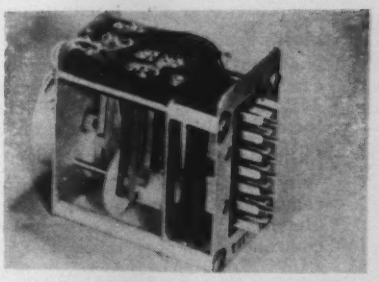
Pipe Expansion Joint Permits Self-Support



Complete self-support of piping systems is permitted by hinged expansion joints. This reduces pipe line bending stresses; movement is more closely controlled. The hinged expansion joints can carry shear loads and absorb piping weight, wind loads, and other dead loads. The standard model takes rotation in one plane only. Three basic types of expansion joints are available to meet requirements of movement, pressure, and temperature conditions. Slotted hinges are available where axial movement is necessary. (Zallea Brothers)

For more data circle No. 41 on postcard, p. 111

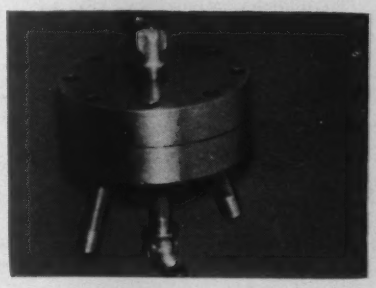
Repeat Cycle Timers Provide Long Time Usage



Repeat cycle timers, guaranteed to operate continuously for at least one year, feature both long life and quiet operation. Two printed circuit cables are used to wire twelve output circuits. A pair of parallel cam shafts provide two cycling speeds. About 4 x 3 x 2 in., including a clear plastic dust cover, these units are suitable for commercial or industrial applications in appliances, vending machines, computers, and machine controls. Simple motor mounting requires three screws. (A. W. Haydon Co.)

For more data circle No. 42 on postcard, p. 111

Differential Pressure Valve Has One Moving Part

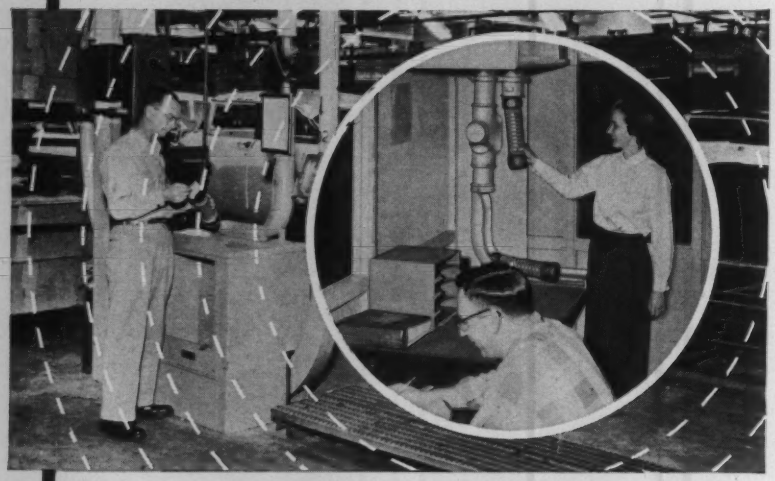


With a single moving part, a differential pressure valve is actuated on the control side by air, gas or other fluids. The working side handles gases, fluids or slurries. The valve divides the flow of an entering fluid two to six ways. It's useful in mixing operations where two or more fluids enter and must leave through a common exit. Fast response, quiet operation and economical installation are additional features. Operating differential is 1 oz per sq in. to 145 psi. (Frankel Engineering Laboratories, Inc.)

For more data circle No. 43 on postcard, p. 111

MECHANIZE... PROFIT-WISE!

...with a LAMSON AUTOMATIC AIRTUBE SYSTEM



Now, all departments are but seconds apart and fully informed

If time means money to you — why spend it on paper?
Stop for a moment. Try to estimate how much it costs to send one message from your department to another.

Multiply the costs

Now, envision a system whereby you place your message in a handy carrier, dial its destination, place it in a nearby LAMSON AUTOMATIC AIRTUBE and sit back confident that your message is flying through the air directly to its destination, arriving in a matter of seconds.

Multiply the service

Why not consult a LAMSON Field Engineer. He specializes in inner-communications systems that keep *orders, invoices, records, punch cards, blueprints, small tools, samples, inter-office memos, mail* . . . flying a controlled inner-air route at 25 feet per second, 24 hours a day — AUTOMATICALLY.

Multiply the savings

They will amortize the entire cost of the installation. Simply clip this advertisement to your letterhead for full information about Automatic Airtube Systems and mail to:

LAMSON

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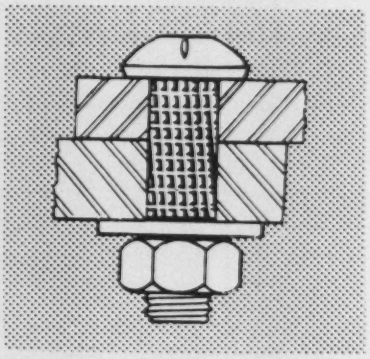
Manufacturers of Airtube® (Pneumatic Tube Systems) • Integrated Conveying Systems • Pallet Loaders • Selective Vertical Conveyors • Bookveyors® Clinical • Trayveyors® • Food Service Systems • Blowers and Exhausters • Exidust® Central Vacuum Cleaning Systems • Dryset® Air Vacuum Systems

DESIGN DIGEST

Bearing Bolts

Composed of heat-treated high carbon steel meeting ASTM specifications, high strength bearing bolts can be assembled wherever a conventional high strength bolt can be employed in regular punched or drilled holes. The shank consists of rows of specially formed knurls set on a spiral, thus reducing the

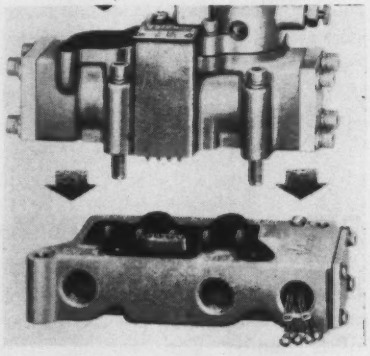


driving load. The bolts drive or are pulled into place. Possessing great slip resistance and high clamping force, these bolts require simple installation, reduce erection time and cost, and have the same assembly technique as for high strength bolts. (United States Steel Supply, Div. of United States Steel Corp.)

For more data circle No. 44 on postcard, p. 111

Control Valves

Fast, automatic completion of electrical and pneumatic circuits, is accomplished by a line of basic ½-in. single and double solenoid,



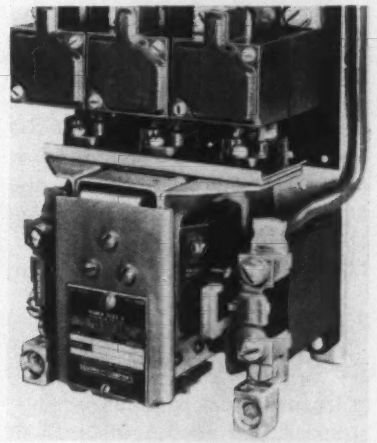
plug-in type, pilot operated, four-way control valves. Consisting of one-piece solenoid pilot housings, and weight-saving aluminum bodies

and sub-bases, valve maintenance is minimal. Designed for a range of 35-200 psi air service, the valves are available with solenoid coils for ac or dc, any voltage or cycle. (Valvair Corp.)

For more data circle No. 45 on postcard, p. 111

Starter Switch

Trip-free melting alloy overload relays with unit construction thermal units, or adjustable bimetallic overload relays with hand and automatic reset are features of a new



starter switch. Extra electrical life is provided by molded coils and contact blocks, and large contact tips of special silver alloy. (Square D Co.)

For more data circle No. 46 on postcard, p. 111

Hydraulic Feeds

Fully controlled hydraulic feeds, used for punching, clamping, riveting, shearing, or pressing, are powered by a shop's own air supply.

They are compact, self-contained units requiring no pumps or motors. There is no bounce at point of break through or when load is released. Almost any sequence of operations can be performed automatically. (Superior Controls)

For more data circle No. 47 on postcard, p. 111

NEW BOOKS

"Proceedings of Industrial Technology Conference on Metals Processing" is the report of a 1957 conference at Watertown Arsenal. Accomplishments, problems, and new processes concerning foundry technology, fabrication, metalcutting, and inspection are discussed. 392 pp. $5 per copy. Order PB 151308 from OTS, U. S. Department of Commerce, Washington 25.

"Compilation of ASTM Standards Relating to Coated and Uncoated Iron and Steel Sheet and Strip, A-1, A-5." 148 pp. $3 per copy. American Society for Testing Materials, 1916 Race St., Philadelphia 3.

"Properties of Matter," Third Edition, by F. C. Champion and N. Davy, covers selected topics in the field, orienting the subject to atomic interpretation. 334 pp. $10 per copy. Philosophical Library Inc., 15 E. 40th St., New York 16.

"Steelmaking for Steelmakers," by A. Jackson, consists of a series of short articles. These informative articles cover steelmaking as seen from the melter's seat. 265 pp. $6 per copy. The United Steel Companies Ltd., 17 Westbourne Rd., Sheffield 10, England.

"High Temperature Materials," edited by R. F. Hehemann and G. M. Ault, summarizes current knowledge and recent developments in the field, and discusses all materials for use above 1500°F. 544 pp. $17.50 per copy. John Wiley & Sons, Inc.

"Testing for Notch Sensitivity in Welded Joints," by C. E. Hartbower, is a critical review of selected papers on such testing, by means of the V-notch Charpy impact test. 24 pp. 75¢ per copy. Order PB 151630 from OTS, U. S. Department of Commerce, Washington 25.

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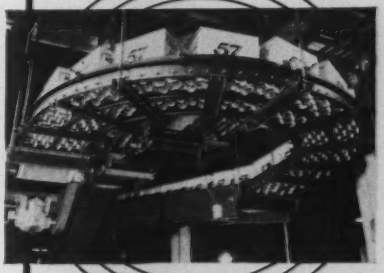
WITH LAMSON ENGINEERED CONVEYOR SYSTEMS



Engineers Break A Bottleneck

It's True.

Mechanization will increase the capacity of your present buildings and the production of your present equipment. Increased profits will amortize the expense.

But, you need the touch of experienced materials handling engineers to guarantee this result. That is where LAMSON leads all the rest.

During the past 75 years, LAMSON engineers have created more custom engineered conveyor systems that have cut costs, raised production and profits than any other firm. For complete, professional service from problem analysis through installation and beyond, you can depend on LAMSON.

Write LAMSON today for a complete conveyor catalog. It may provide the answer to your materials handling problem. Or, simply clip this advertisement to your letterhead and mail to:

LAMSON

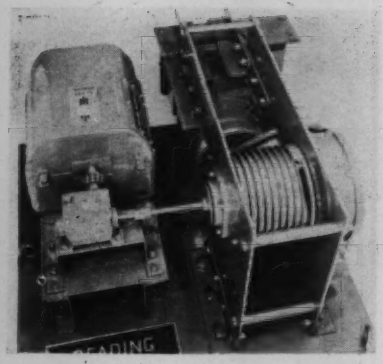
LAMSON CORPORATION

104 Lamson Street, Syracuse 1, N. Y.

PLANTS IN SYRACUSE AND SAN FRANCISCO

OFFICES IN ALL PRINCIPAL CITIES

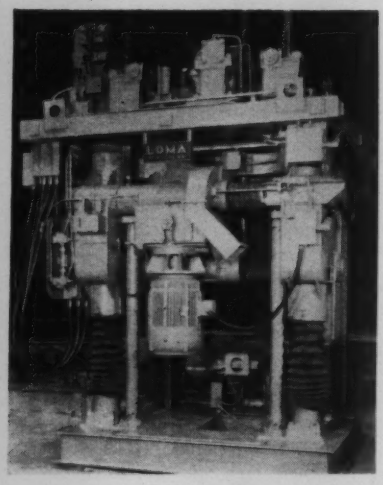
New Equipment and Machinery



Hoist Increases Quality Steel Production

Especially developed for the steel industry, is an oxygen jet lance hoist. Capable of remote mounting and automatic control, the hoist is readily adaptable to floor, wall or ceiling mounting to meet explicit furnace requirements; the standard design has a 2000-lb lifting capacity. The hoist is driven by a 3-hp motor with speeds, controls, limit switches, and brakes designed to user specifications; fluid drive can also be supplied. Limit switches and remote controls can be provided for all conditions. The jet lance hoists are incorporated with up to a 10-circuit limit switch. The hoists have been thoroughly field tested in over 20 production steel plants. (Reading Crane and Hoist Corp.)

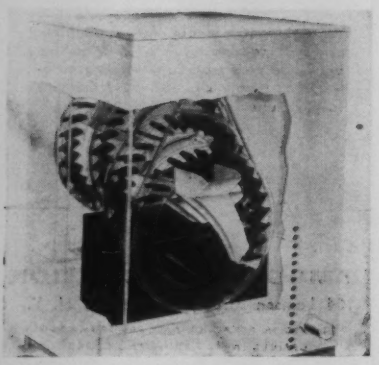
For more data circle No. 55 on postcard, p. 111



Continuous Casting Machine Promotes Production

Copper billet and slab casting technique is greatly advanced by the operation of a fully continuous casting machine. The equipment handles copper in all its various forms; the basic design of the machine also lends itself to the casting of brasses, bronzes, aluminum and magnesium alloys. The shapes produced on the unit are round piercing and extrusion billets, square wire bars and rectangular slabs. The machine's production capacity ranges from 3 tons per hour for double-strand casting of 3-in. diam billets to 10 tons per hour for single strand casting of 5½ in. x 33 in. slabs. The casting machine: is usually fed with liquid metal, has billet, bar and slab molds of copper construction, and withdraws metal strands from the molds by a double set of 9-in. diameter pinch rolls. A flying circular saw cuts billets or slabs which are received in a discharge basket. As a final operation, a stamping device imparts an identification mark to one end of the casting. (Loma Machine Mfg. Co., Inc.)

For more data circle No. 56 on postcard, p. 111



New Process Combines Cleaning With Production

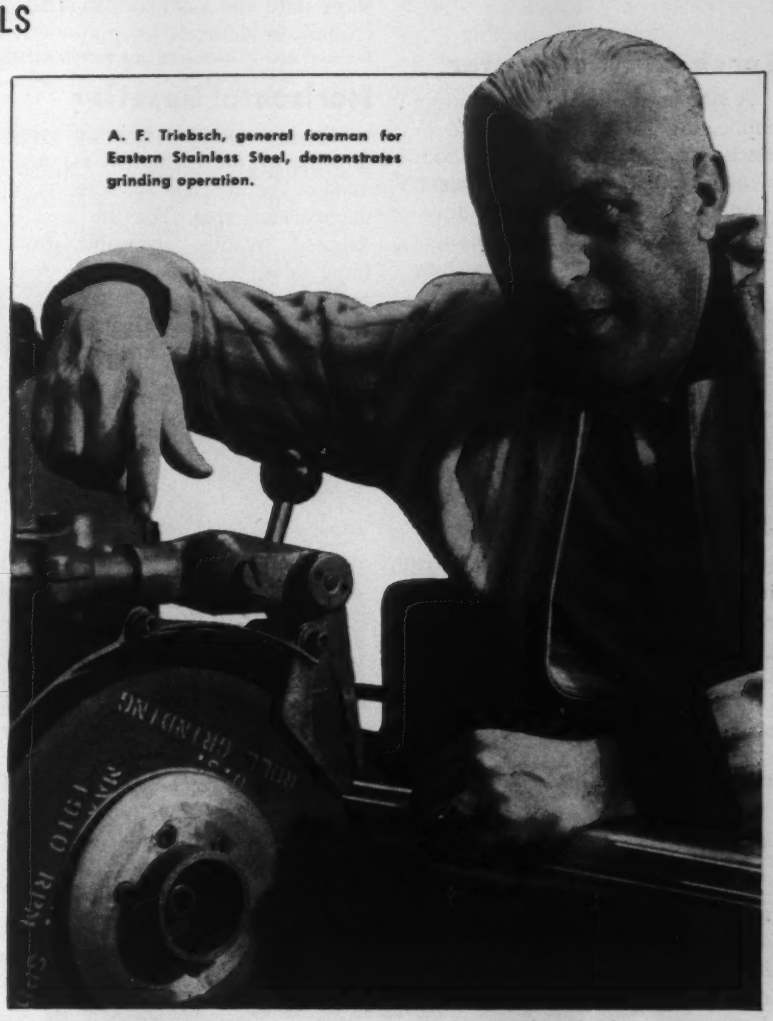
The integration of cleaning and degreasing with high speed production, is a feature of an advanced machine. Machined and sheet metal parts are processed as fast as they leave automatic fabricators. Parts enter the machine directly from metal parts fabricating devices, as well as tote boxes via vibratory hopper feed. As the parts move through a series of four rotating wheels, they are first immersed in a degreasing solution, powered by ultrasonics, rinsed, drained, and then passed into a drying chamber. Flexible as to the selection of solvents, water solutions, acids, and to design and size, the electrically operated machine can be used with parts of all shapes. (Metalclean Equipment Co.)

For more data circle No. 57 on postcard, p. 111

US RUBBER GRINDING WHEELS

NO CHATTER

Production UP 8%!



A. F. Triebsch, general foreman for Eastern Stainless Steel, demonstrates grinding operation.

"U.S." Grinding Wheels help EASTERN STAINLESS STEEL achieve tolerances of 2/10 of .001" in precision work

In producing stainless steel of great precision, the steel passes through a succession of work rolls under a combined force of 59,000 pounds per square inch. All the rolls must be perfectly round and the tiniest defect must be eliminated. To produce a perfectly flat mirror finish, the rolls have to be 2/10ths of .001" perfect!

This is the kind of work Eastern Stainless Steel Corporation turns out every day. To keep their rolls in perfect balance and symmetry they use "U. S." Grinding Wheels. These amazing wheels allow for no "chatter" or vibration, consequently they never groove the roll. Prior to the use of "U. S." Grinding Wheels, at least an hour a day was lost when the operator had to readjust the machine.

Using "U. S." Wheels, Eastern Stainless Steel found many collateral advantages. Maintenance was reduced by more than 20%. "U. S." Grinding Wheels outlast conventional wheels at a ratio of 4 to 1, an obvious saving of 400%.

You, too, can effect important economies and achieve greater precision by turning your grinding wheel problems over to U. S. Rubber.

US RUBBER

Mechanical Goods Division

United States Rubber

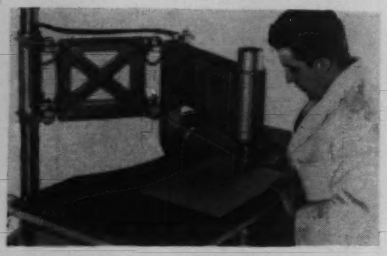
WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

NEW EQUIPMENT

Torch Cut Duplicator

A simple to operate torch cutting duplicating machine, for single or batch cuts, utilizes four methods of operation: cutting to sheet-metal template, cutting direct from drawing, circular cutting, and straight cuts in any direction. The machine



can cut any shaped sections from iron plate 0.118- to 4.0-in. thickness. Rugged construction, a pantograph, joint-arm design of annealed light metal, and instant readiness for each mode of operation are some of its features. (Milo Mfg. Co.)

For more data circle No. 58 on postcard, p. 111

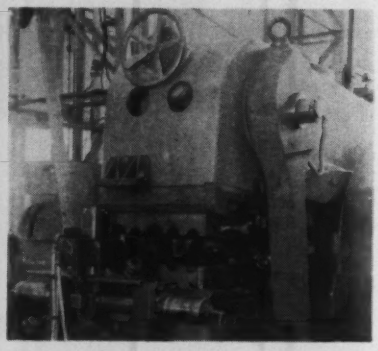
Shear Feed

An automatic shear feed replaces the rear operator in back-to-front shear feeding of large sheets. With it, one man can outproduce two men, and with greater accuracy. He feeds stock into the front of the shear through the blades, until the trailing edge passes over the front gage. Then the sheet is automatically driven back against the front gage for shearing. This cycle is repeated with the remainder of the sheet until the stock is exhausted. (American Actuator Corp.)

For more data circle No. 59 on postcard, p. 111

Horizontal Upsetter

High production rates are made possible by the horizontal arrangement of the dies and accessibility of the working area. The die area is exposed, readily accessible from three sides; consequently, the stock can be upset axially and at any angle up to 180° right or left. Forging accuracy is held to very

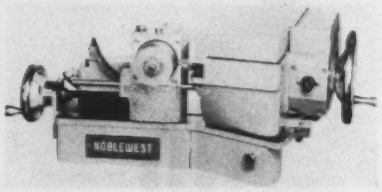


close tolerance. Featuring easy maintenance, the horizontal upsetter also provides a long gather and pull-off, thus giving a greater product range. Automatic transfer is an advantage found in the machine. The upsetter is made in a full range of sizes from 1-in. (50 tons) to 9-in. (3150 tons). (EUMUCO, Leverkusen, Germany)

For more data circle No. 60 on postcard, p. 111

Graduating Machine

A circular graduating machine accurately and quickly cuts graduations into handwheels, dials, knobs, and other similar parts used on machinery and instruments. The machine is capable of English, metric, and degree graduations. With the



cutting of the graduation performed by a single-point tool, the machine's cutting speed varies from 145-180 graduations per minute according to the indexing cam used. Smallest and largest diameter graduated is 1½- and 20-in., respectively. (The Noble and Westbrook Mfg. Co.)

For more data circle No. 61 on postcard, p. 111

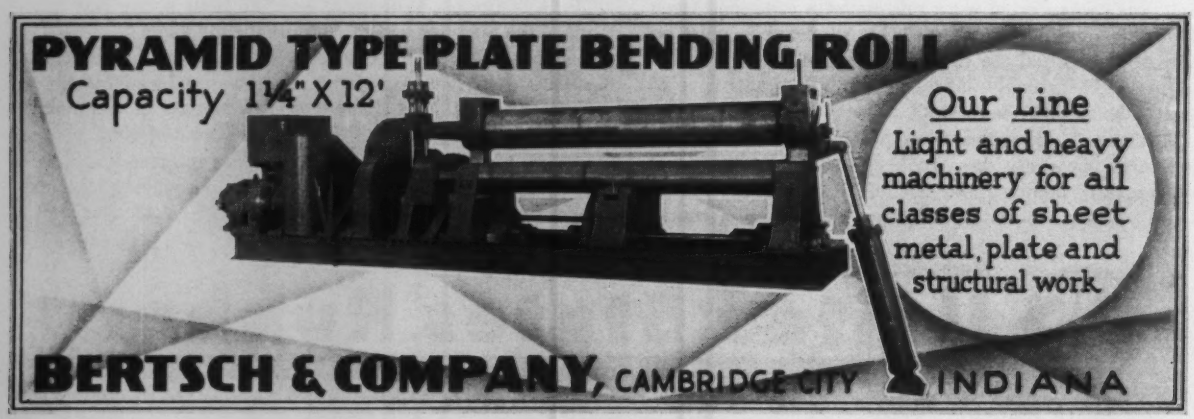
Thread Cutting Tool

Lowering the time required for thread cutting by as much as 40 pct, a new tool incorporates a cutting disk with a negative profile which cuts both sides of an individual thread simultaneously. Cutters are available in either high speed steel or quality carbide. A tool for either internal or external thread cutting can be provided. (Acme Tool Corp.)

For more data circle No. 62 on postcard, p. 111

Die Repair Process

Die errors, scratches, cavities, and undercuts can be repaired by a new process. The process involves the fusion of metal pellets by a gun type welding device into the damaged die. The fusion is produced by a short pulse of high


PYRAMID TYPE PLATE BENDING ROLL
Capacity 1¼" X 12'
Our Line
Light and heavy machinery for all classes of sheet metal, plate and structural work
BERTSCH & COMPANY, CAMBRIDGE CITY INDIANA

density electrical current in the welder. Shortly after the process, the die may be filed or finish ground

and polished until detection of the original flaw is almost impossible. (Mid-States Welder Mfg. Co.)

For more data circle No. 63 on postcard, p. 111

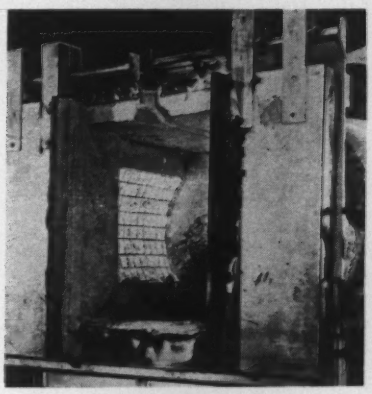
Anti-Rust Spray

Rust and corrosion of valuable metal parts is averted due to an anti-rust aerosol spray. The spray mist penetrates into joints and crevices; displacing moisture already present, the mist forms a very thin waxy film that clings tightly, but is easily removed by a light solvent. The spray can also be used on precision instruments, tool and dies and motors. (Industrial Supply Div., Sprayon Products, Inc.)

For more data circle No. 64 on postcard, p. 111

Heat Treating Furnace

Within 10 minutes after ignition, a luminous wall heat treating furnace attains temperatures in excess of 2000°F. A special porous refractory lining, encased in steel shell, allows a controlled mixture of gas and air to pass through uniformly. A pilot light ingnites the mixture at the face of the refractory, and a uniform, almost instant radiant heat is available. (The A. F. Holden Co.)

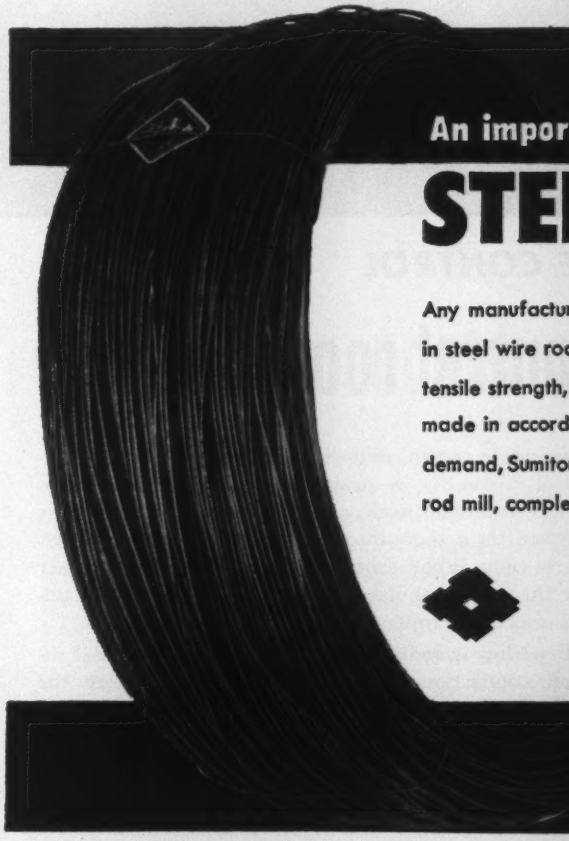


For more data circle No. 65 on postcard, p. 111

Vacuum Hand Probe

Operated entirely by vacuum, a multi-purpose hand tool permits faster handling, more accurate and efficient control in sub-assembly operation of small, delicate, parts. The tool, vital in inspection work, reduces the required time for this type of work. Fragile parts can be inspected without pinching or nicking. Vacuum provides a uniform pressure to hold the various parts. It reduces the counter effects of dirt, lint, or other foreign matter picked up by small parts. Plastic tips, which adjust the pressure, are available to fit any inspection operation. (Air-Vac Engineering Co.)

For more data circle No. 66 on postcard, p. 111



An important message for the man who buys

STEEL WIRE RODS

Any manufacturer of nail, wire mesh or barbed wire looks first for quality in steel wire rods. For rods that are uniform in size and of the specified tensile strength, mill owners have learned to rely on Sumitomo's wire rods, made in accordance with strictest standards. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

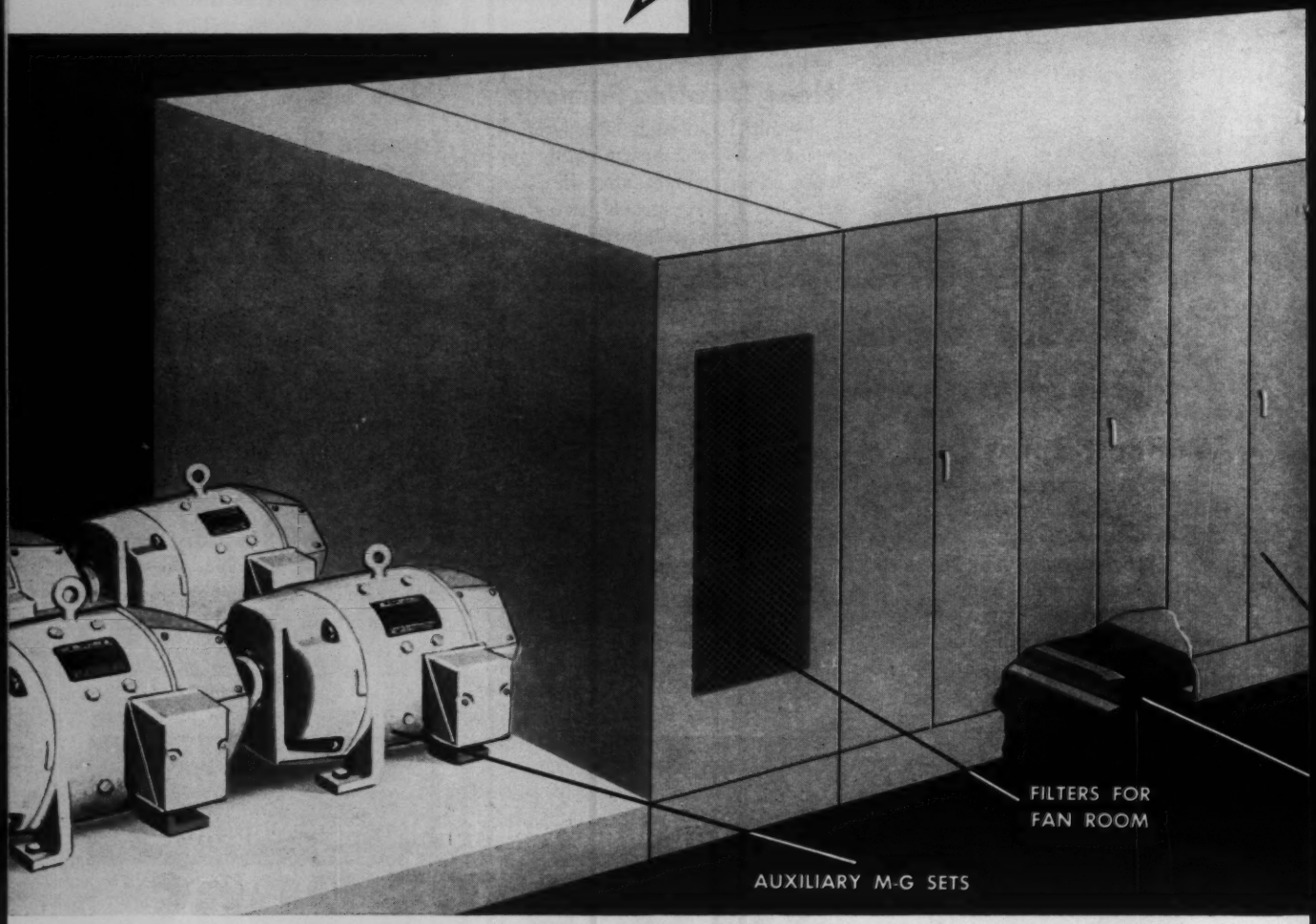
LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS

SUMITOMO METAL INDUSTRIES, LTD.

HEAD OFFICE: OSAKA, JAPAN
CABLE ADDRESS: "SUMITOMOMETAL OSAKA"

FOR QUALITY... PRODUCTIVITY ...PROFIT

METAL ROLLING AUTOMATED BY GENERAL ELECTRIC



A NEW PRACTICE IN PROCESS-LINE CONTROL

G-E "packaged" motor-control rooms reduce

The latest innovation in modern steel-mill process-line control is General Electric's new "packaged" motor-and-control room. This novel design, developed jointly by General Electric and Jones and Laughlin Steel Corp., groups all controls and m-g sets into one compact centralized unit. The above unit will be installed at J&L's Aliquippa, Pa., works, as part of their continuing facilities-improvement program. Previously, the installation expense on this equipment often matched or exceeded the actual cost of the equipment. The new G-E motor-control room design cuts installation costs as much as 40 percent!

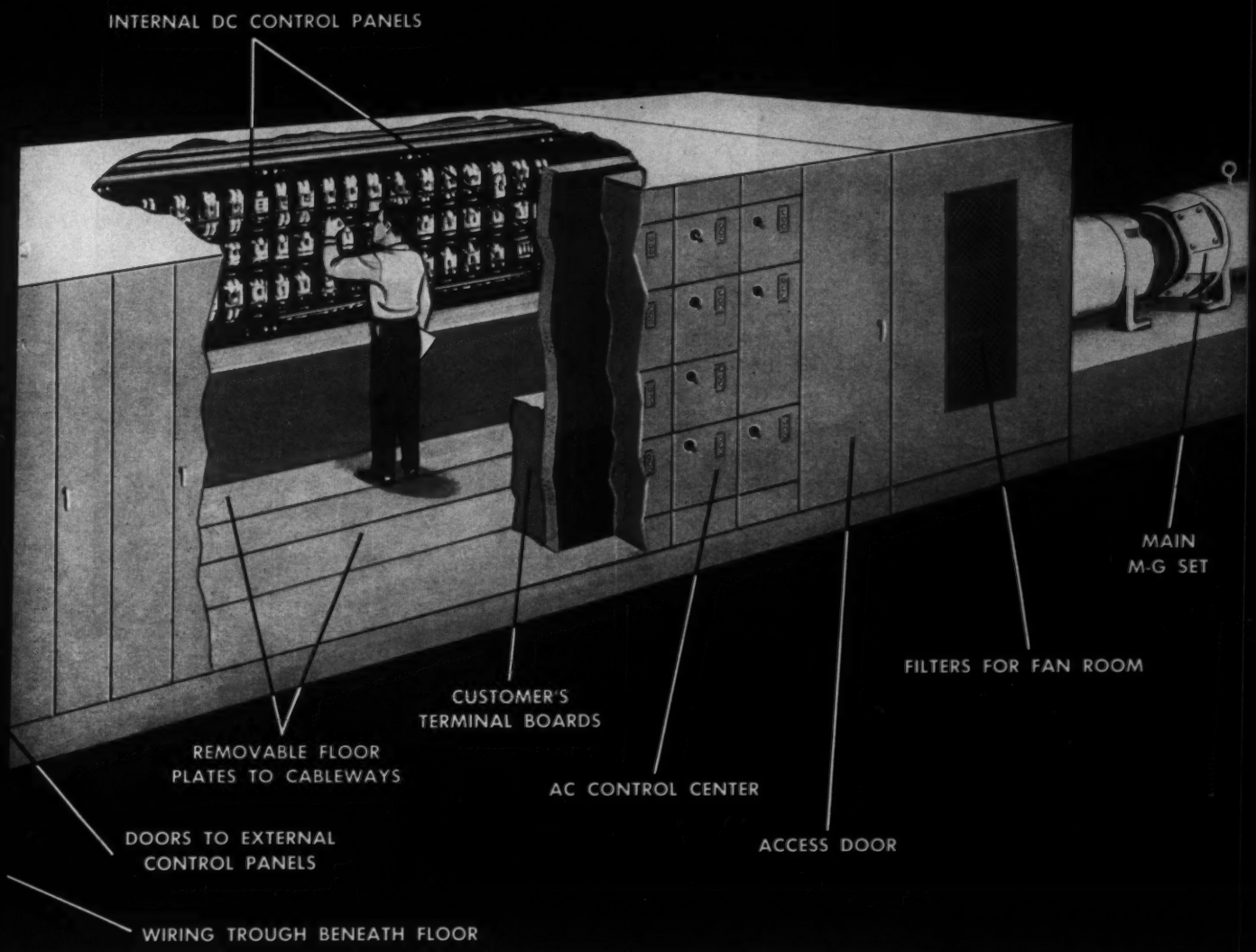
HERE'S WHY INSTALLATION COSTS ARE LOWER

Substantial savings on installation expenses can be realized through these features:

Independent control unit—The General Electric motor-control room is a completely co-ordinated, pre-assembled unit in itself, and in many cases, eliminates the need for a separate motor room. Since the motor-control room is self-contained, it may be located either near the driven equipment or in some previously unused area of the mill.

Field wiring is reduced by one-third or more—All internal connections are made and tested before the motor-control rooms are shipped. The only field wiring required is the connection of the power source and the leads to the operators' stations and the drive motors.

Construction engineering costs reduced—General Electric's grouped control concept enables the mill to know its conduit requirements much sooner. Thus, fewer,



installation costs as much as 40 percent!

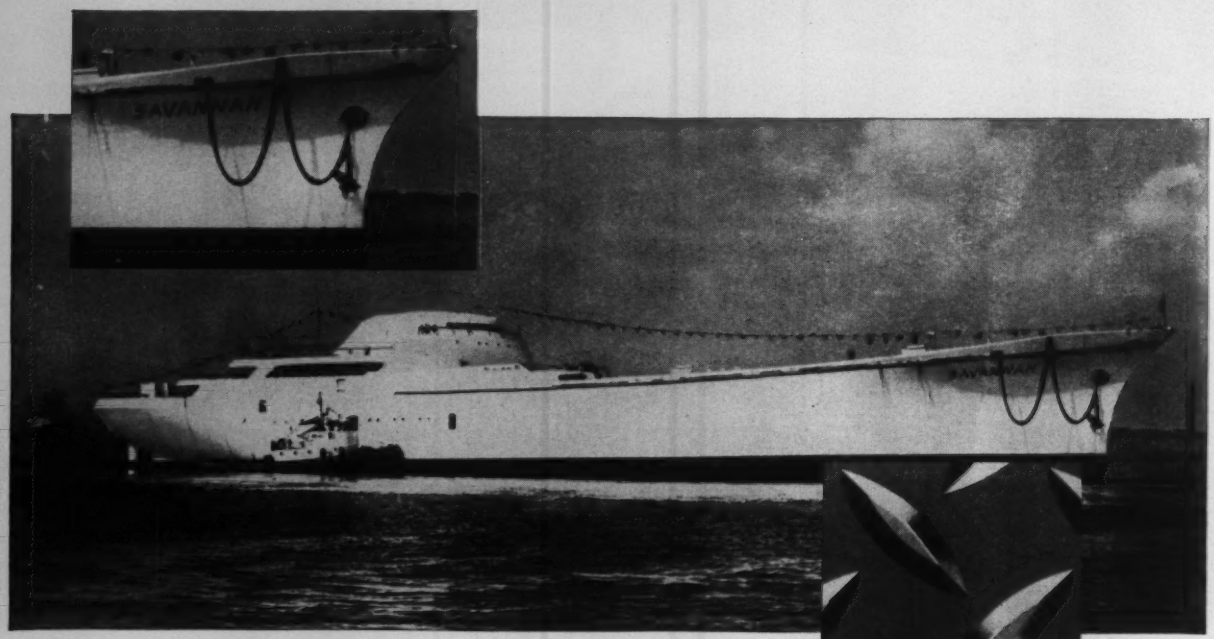
less-complex construction diagrams are needed, and actual construction can begin at an earlier date.

Common base minimizes installation time—This new "packaged" motor-control room, delivered on its own self-supporting platform, can be immediately set on a normal mill floor. It does not require expensive, specially-constructed foundations. With m-g sets built and shipped on a common base, the need to align them at the mill site is eliminated. In addition, regulating equipment is factory-tested prior to shipment, further expediting startup time.

For all the details on this new technique in process-line control, contact your G-E Sales Engineer today! General Electric Company, Industry Control Department, Salem, Virginia, and Direct Current Motor and Generator Department, Erie, Pennsylvania. 785-7

Progress Is Our Most Important Product

GENERAL ELECTRIC



Safety Is Sure . . . *on the N.S. Savannah*

A. W. Super Diamond floor plate assures safe footing on new atomic-powered cargo ship

Floor plate on the N.S. Savannah, world's first nuclear-powered merchant ship—is Alan Wood Super Diamond. Described as "the safest ship in the world," the Savannah, built by New York Shipbuilding Corporation, Camden, N.J., was designed and constructed to meet the highest safety standards of several government agencies, including the Maritime Administration and the AEC.

A.W. Super Diamond is installed throughout the ship to provide officers and crew the safest footing available. This heavy duty floor plate will last for years . . . is easy to clean . . . easy to fabricate . . . easy to match.

Specify A.W. Super Diamond for your "safety-sure" flooring. Write for Bulletin SD-SII.

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

DISTRICT OFFICES: Philadelphia • New York • Los Angeles • Boston • REPRESENTATIVES: Atlanta • Buffalo Cincinnati • Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul • San Francisco • Seattle Montreal, Toronto and Vancouver, Canada—A. C. Leslie & Co., Ltd.

The Iron Age Summary

Auto Production Grips Market

Record schedules of automakers keep the market tight for products used in automaking.

But, slow but sure, some order is being restored to the market for most users.

■ Near-record auto production is the dominant factor in the steel market.

With auto output approaching the all-time high rate of 1955, virtually all steel products that have an automotive market are in tight supply. And they will stay that way as long as production continues to soar.

Edging Up—This week's schedule of 178,000 cars is the highest since December, 1955. Output is creeping toward the all-time weekly high of 184,114 set in the last week of April, 1955.

And it's likely that production will continue to edge up for some weeks. Additional assembly operations for the small cars are going into production soon and will be a factor in production gains.

Tightest Products—As a result of the soaring auto output, cold-rolled sheet, hot-rolled sheet and hot and cold-finished bars used by automakers are tight. There will be little easing until auto production tapers off from the first-half surge.

Other major factors in the steel market are demands from canmakers for tinplate and the continued strong demand for galvanized.

Tinplate may be the most critical product. Mills are having difficulty rebuilding their in-plant reserves of tinplate and some will not be able to get satisfactory stocks before canners come in with heavy seasonal demands.

Order Restored — But overall, order has been restored to the steel market for most products. Mill shipments are ahead of consumption and some major users are able to get inventories into fairly good balance.

The market is far from easy, however. Conversion will continue through the first quarter and in the second quarter in the Midwest. Conversion deals (obtaining semi-finished steel from one source for finishing elsewhere) were very successful in helping major steel users, particularly automotive, over the rough spots after the strike.

A Few Cancellations — Other than automotive, the market begins to look less frantic. There have been some deferments and cancellations. In small quantities, plates and structurals have been offered for late February or March, wire in two to three weeks, oil country seamless in two months.

Mills have obtained better production than expected and mill schedules are now clearly known. Customers, although probably not getting all the steel they would like, do have some assurance of continued supply.

Also apparent nationally is a difference in market conditions by region. The Midwest and Chicago reflect extreme tightness. This stems from the large automotive and appliance industry concentrations there, with the resulting demand for flat-rolled products.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,750	Last Week 2,736	Month Ago 2,689	Year Ago 2,179
Ingot Index (1947-1949=100)	170.9	170.2	167.4	135.7
Operating Rates				
Chicago	95.0	95.0	94.0	88.5
Pittsburgh	99.5	97.0*	98.0	76.0
Philadelphia	102.0	102.0	101.5	81.0
Valley	90.5	92.0*	93.0	59.0
West	90.0	89.0*	93.0	86.0
Cleveland	100.0	97.0*	98.0	84.0
Detroit	99.0	107.0*	99.5	83.0
Buffalo	105.0	105.0	107.0	78.0
South Ohio River	99.0	97.0	102.0	89.0
South	93.5	93.5	89.0	72.0
Upper Ohio River	95.0	91.5	94.0	81.0
St. Louis	102.0	97.0*	97.5	95.0
Aggregate	96.5	96.0	95.0	77.0

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$42.50	$41.83	$47.17	$41.17
No. 2 bundles	$28.50	$28.17	$27.83	$29.17
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	29.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	100.375	100.375	98.50	99.875
Zinc, E. St. Louis	13.00	13.00	12.50	11.50

Radiant Heaters Get More Uses

Radiant heaters are starting to get more use in metalworking and other industries.

Converting natural or bottled gas into heat, they can cut heating costs.

▪ Gas-burning radiant heaters are making a major breakthrough into metalworking and other industries.

Their first impact was for relatively simple space heating use where the heat could be confined to small areas in large buildings. Originally they were more or less temporary in type. Now whole new plants are being heated this way. Yoder Co. of Cleveland has installed 99 Schwank type heaters made by Perfection Industries Div. of Hupp Corp. and saved $1900 operating costs under estimates from September 1958 to May 1959. A larger installation is coming later. Industry sales generally are about 50 pct over last year.

Greater Savings — What is believed to be the world's largest installation space-wise is a 978-burner installation of Van Dorn Iron Works Infra-Red Heater Div. units at Wellman Engineering's 200,000 sq ft Cleveland plant. Van Dorn is guaranteeing 30 pct savings compared to conventional space heating systems. Savings have hit 50 pct, says John S. McElwain, division manager.

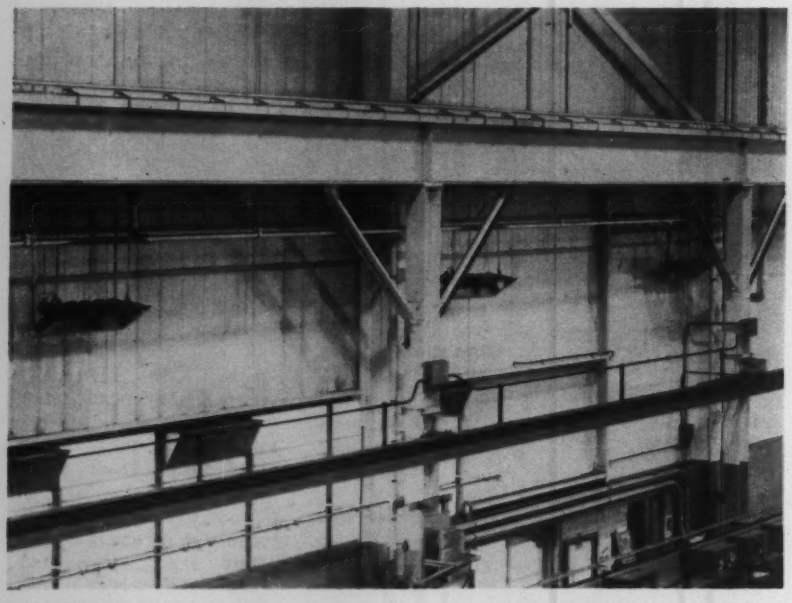
The big breakthrough, however, is coming in industrial applications. Die molds for aluminum are being pre-heated at a Chicago plant with prolonged mold life with Perfection units. Van Dorn units in Colorado and New Mexico are pre-heating steel pipe up to 4 ft diam preparatory to vinyl coating. In a Chicago area steel mill, Van Dorn units are pre-heating coils of steel preparatory to galvanizing. The sheet is 36 in. wide and moves at 20 ft per min. A Cleveland sheet mill has also recently installed them in its storage warehouse for condensation control.

Ore Thawing — In the nick of time for the winter rush of rail cars of frozen ore, a Youngstown mill is just completing installation of the first major ore thawing unit. In Duluth, a pilot thawing operation has proved successful and the world's largest ore thawing installation—34 railroad cars long—is being planned for installation in the spring.

Outdoor installations are now being licked, too. Early users were disappointed when the units blew out in the wind. But now a honeycomb across the face of the burner has largely ended the problem.

Convert Gas—Both convert natural or bottled gas heat energy into radiant heat which is directed by reflectors. Two Michigan firms are also in the field, Detroit Radiant Products Co., of Warren, and Sun Ray Engineering Co., of Grand Rapids. Some French units are also being imported.

The Yoder installation is an illustration of the savings possible with the new units on straight space heating installations in high bay areas. The heaters were first installed on a 40,000 sq ft section of the firm's new plant. Based on their successful operation, they are scheduled for use in a new 168,000 sq ft section in the planning stage. A major advantage there is that the heaters can be moved around and plugged quickly into outlets as required.



DIRECTED HEAT: Infra-red heaters are mounted along the room perimeter and angled away from the wall to direct energy rays in a spread pattern over floor, men and machines. Units have capacity of 48,000 Btu per hour.

EC-1357 cuts costs, makes possible stronger sandwich panels

LABORATORY TESTS show EC-1357 provides the high strength and rigidity called for in nonload-bearing sandwich structures.

3M Adhesive EC-1357 bonds all kinds of skin and core materials *without heat.* You'll speed production, cut costs, build in high strength for non-load-bearing sandwich panels.

You can force-dry the solvent out of the adhesive prior to bonding. And a nip roller or cold press is all that is required to complete the bond.

EC-1357 provides maximum immediate strength. And the bond continues to strengthen as it cures at room temperatures.

Dark in color, EC-1357 absorbs infrared heat quickly, dries fast; so no production delay is necessary. And it sprays on with minimum cobwebbing, thus saving materials.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU!

Consult 3M Research. Contact your 3M Field Engineer. Or, for information and free literature, write: A.C.&S. Division, 3M, Dept. SBQ-10, St. Paul 6, Minnesota.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Market Loses Frenzy, Stays Tight

With mill shipments going out at a steady pace, the market is less hectic.

But outlook is for continued tightness in many products.

▪ Some of the heat and fury has left the steel market. But it's still a long way from easing.

Better-than-expected mill production has put more steel into product pipelines. As a result, mill shipping schedules are more established. Customers, assured of continuing supplies, are relaxing a little.

Warehouse Optimism — Service centers are also encouraged by the better flow of steel. They have been able to build up inventories of standard structurals. And they are confident stocks of plates and wide flange beams will be improved in the second quarter.

But with all this, they are still having trouble filling some orders. "In many cases," says a **Midwest** service center sales official, "we're able to fill about 70 pct of an order from stock. The other 30 pct remains unfilled in many cases. We suggest substitutes, but customers aren't buying them. As a result we've got quite a few back orders piling up."

Warehouse Prices—Quantity differentials in Pittsburgh on carbon steel products were changed, effective Jan. 25, by Jos. T. Ryerson & Son.

The price change—described as a $1 a ton reduction—is aimed at encouraging larger quantity buying, Ryerson says.

Sheet—Boom demand for flat-rolled products looks assured for the first six months and possibly into the third quarter. Right now, sheet buyers in the **Midwest** are running into mill carryovers. Cold-rolled sheet is causing the most trouble. But in some cases, carryovers also exist for hot-rolled sheet.

Bar — Automakers and farm equipment builders are heavy buyers of cold-drawn bar. **Midwest** users of hot-rolled bar are complaining about mill cuts in their quotas. Further east, at **Pittsburgh,** buyers are pressuring mills for February and March deliveries. Producers wonder if some of the pressure will go out of the market in the second quarter.

Plates and Shapes—There have been some spot adjustments in mill schedules for plates and structurals. Small quantities of both plates and shapes have been offered by **Pittsburgh** mills for delivery in late February or March. The tonnage was available, partly because of deferments or cancellations, partly because of better-than-expected mill output. However, in the **Chicago** market, plate is very tight and deliveries are as slow as sheet deliveries.

Service Centers — Warehouse sales are improving since the fall-off of December and early January. Business is expected to keep getting better through March. By then sales should level off and hold at existing rates until May or early June.

Heavier mill shipments have taken some of the pressure off warehouses. More standard structurals are available. By the second quarter, mills should catch up with service center demand for plates and wide flange beams.

Right now sheet and strip are in the greatest demand among warehouse buyers. But cold-rolled sheet stocks are still full of gaps. Orders for odd sizes of angles and channels are also difficult to fill. Stainless steel inventories are in better shape.

Last week, **St. Louis** and **Kansas City** warehouses cut prices on hot-rolled carbon products. (New prices appear on p. 139.) The cuts —ranging from $5.40 to $7.20 a ton—apparently resulted from a local competitive condition. They are not expected to spread to other areas.

Ferroalloy Price Changes—Most producers have followed the lead of E. J. Lavino & Co., Phila., in reducing standard ferromanganese by $25 a ton. Trade sources say the cut is an effort to narrow the spread between domestic and imported ferromanganese. The move also reflects reductions in foreign ore prices and ocean transport. (For new prices see p. 141.)

In addition to reductions in ferromanganese, other price changes were announced by Union Carbide Metals Co., Div. of Union Carbide Corp. Silicomanganese was reduced by 1.2¢-1.3¢ a lb, medium-carbon ferromanganese was dropped 1.5¢ a lb, and some grades of low-carbon ferromanganese went down by 1.6¢-3.1¢ a lb. The company also announced lower prices for low-carbon ferrochrome and 40/43 ferrochrome-silicon. (Details on ferroalloy prices appear on p. 141.)

PURCHASING AGENT'S CHECKLIST

Depreciation reform gets President's attention. P. 43

Producers of malleable iron castings are looking for a strong sales year. P. 48

Most service center inventories should be in balanced supply by the second quarter. P. 50

COMPARISON OF PRICES

(Effective Jan. 26, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Jan. 26 1960	Jan. 19 1960	Dec. 29 1959	Jan. 27 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	13.55	13.55	13.55	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Jan. 26 1960	Jan. 19 1960	Dec. 29 1959	Jan. 27 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	11-12¼*	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.50*	$43.50	$42.50	$45.50
No. 1 steel, Phila. area	41.50	41.50	41.50	38.50
No. 1 steel, Chicago	41.50*	40.50	39.50	43.50
No. 1 bundles, Detroit	40.50*	39.50	37.50	38.50
Low phos., Youngstown	49.00*	48.50	48.50	47.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	51.50
No. 1 mach'y cast, Phila.	54.50	54.50	54.50	56.50
No. 1 mach'y cast, Chicago	62.50*	60.50	60.50	56.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$42.50*	$41.83	$47.17	$42.50
No. 2 bundles	28.50*	28.17	27.83	29.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50
Foundry coke, prompt	18.50	18.50	18.50	18-18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	29.00
Copper, Lake, Conn.	33.00	33.00	33.00	29.00
Tin, Straits, N. Y.	100.375*	100.375**	98.50	99.875
Zinc, East St. Louis	13.00	13.00	12.50	11.50
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites
Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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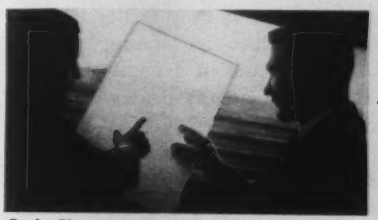
INDEX TO PRICE PAGES

Prices at a Glance	125
Comparison of Prices	129
Bars	136
Billets, Blooms and Slabs	134
Boiler Tubes	138
Bolts, Nuts, Rivets, Screws	139
Clad Steel	138
Coke	138
Electrical Sheets	138
Electrodes	138
Electroplating Supplies	139
Ferroalloys	141
Iron Ore	138
Merchant Wire Products	138
Metal Powders	139
Nonferrous	
Mill Products	133
Primary Prices	129-132-133
Remelted Metals	133
Scrap	133
Piling	134
Pig Iron	140
Pipe and Tubing	137
Plates	136
Rails	138
Refractories	138
Service Center Prices	139
Shapes	134
Sheets	135
Spring Steel	138
Stainless	140
Steel Scrap	131
Strip	134
Structurals	134
Tinplate	135
Tool Steel	138
Track Supplies	138
Water Pipe Index	139
Wire	136
Wire Rod	135



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Will Auto Lists Set the Trend?

Record tonnages of choice auto scrap will hit the market this week.

How bidding goes will set the pace of the market. Firm prices or higher are the rule this week.

■ Prices held firm or rose early this week in advance of closing of auto lists.

Tonnage of scrap offered by booming auto plants is the highest that can be recalled. How the bidding goes will establish the market and set the trend.

But industrial tonnages may be large enough to keep dealer buying at levels close to present prices. This is in spite of general cleaning out of good quality dealer scrap in some markets.

Early this week, market actions indicated there would be strong bidding for the giant lists. Prices moved up in most markets on the basis of new mill buys or broker buying.

Firmness reflected early this week is in contrast to general pessimism or lack of optimism of a week ago. Long periods of time without major mill buys had discouraged many in the trade.

Pittsburgh—Pressure for higher prices increased here. Spot mill purchases, at prices near $48, have reduced the cushion of good scrap that has been standing in large yards. Open market purchases have been pulling scrap out of smaller yards at prices that do not permit full replacement. These developments have tightened the supply of good scrap and brought upward price adjustments. In addition, they have produced a strong demand for February auto scrap.

Chicago — The market advanced along the list, but gains were most marked in blast furnace and cast grades. Renewed foundry activity, plus reports of added blast furnace operations, touched off the price rise, which was confirmed by a number of sales. Broker bidding on factory lists also advanced.

Philadelphia — The market is moving sideways. Mills in the district are accepting only limited tonnages, moving under existing orders. Some mills are out of the market until February. Brokers believe the Midwest auto lists, coming out this week, will establish the market. Export remains active.

New York—This market is also scuttling sideways. Domestic buying is steady, although in small tonnages, and exports continue to move. Demand, however, is too low to raise prices. Most brokers are waiting for auto lists to close.

Detroit — Dealers can't recall when industrial lists were larger than this month. Estimates are 20 to 30 pct more scrap will be turned out by auto plants in February than January. Dealers and mills are waiting to see what prices will result. Some items have shown a jump in pre-list activity. Local mill inventories have not declined significantly.

Cleveland — The market is up slightly as a local mill entered the market for production scrap from restricted yards at $46.50. Some dealer grades are being taken at $45. Auto lists will have higher tonnage and prices are expected to hold or go up somewhat. There will probably be enough list scrap to fill local needs, leaving dealers on the fringe. Some blast furnace scrap is moving at up to $27, but must be almost alloy-free.

St. Louis—A bearish feeling has crept into the market. The expected upturn has not materialized and, for the most, the feeling is that prices are going to hold at about current levels for a while. Movement is moderate, but mills are not anxious to buy. Railroad scrap offerings have been small lately. Some have been withdrawn because of low bids.

Cincinnati—Prices are up $1 on broker buying to cover old orders for steelmaking and blast furnace grades. Dealers are willing to sell at these levels. Cast grades have dropped $2 in a delayed reaction from levels reached after steel operations were started.

Birmingham—No. 1 and No. 2 heavy melting scrap advanced $1 per ton and machine shop turnings $2. Prices are firm and consumers are able to fill needs at prevailing prices. Export is quiet. Electric furnaces and pipe manufacturers are out of the market for the remainder of this month.

Buffalo — There has been no activity and prices are unchanged. Dealers are still waiting for the first sale of No. 1 grades since before the steel strike. Guesses are that it will come around the first of the month. Inventories are high for No. 1 grades but secondary inventories are somewhat reduced.

Boston — The market continues dull, with just enough activity to keep most prices at present levels. There is a trickle of export activity, but not enough to affect the market.

West Coast — Mills are sitting with healthy inventories. Flow of scrap is very slow. Prices are unchanged and little activity is expected during February.

Houston—The market is slow, although a flurry of export is expected. The cast market continues to show weakness.

SCRAP PRICES *(Effective Jan. 26, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	46.00 to 47.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	29.00 to 30.00
Low phos. punch'gs plate	52.00 to 53.00
Heavy turnings	38.00 to 39.00
No. 1 RR hvy. melting	49.00 to 50.00
Scrap rails, random lgth.	60.00 to 61.00
Rails 2 ft and under	64.00 to 65.00
RR specialties	57.00 to 58.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	48.00 to 49.00
Stainless	
18-8 bundles and solids	230.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	42.00 to 43.00
No. 1 factory bundles	46.00 to 47.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. forge crops	56.00 to 57.00
Low phos. punch'gs plate, ¼ in. and heavier	53.00 to 54.00
Low phos. 2 ft and under	51.00 to 52.00
No. 1 RR hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	57.00 to 58.00
Rerolling rails	64.00 to 65.00
Rails 2 ft and under	63.00 to 64.00
Angles and splice bars	56.00 to 57.00
RR steel car axles	61.00 to 62.00
RR couplers and knuckles	53.00 to 54.00
No. 1 machinery cast.	62.00 to 63.00
Cupola cast.	55.00 to 56.00
Cast iron wheels	50.00 to 51.00
Malleable	64.00 to 65.00
Stove plate	52.00 to 53.00
Steel car wheels	53.00 to 54.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	45.00 to 47.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	22.00 to 23.00
Mixed bor. short turn.	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	26.00 to 27.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	48.00 to 49.00
Low phos. 2 ft punch'gs	50.00 to 51.00
Elec. furnace bundles	48.00 to 49.00
Heavy turnings	34.00 to 35.00
RR specialties	50.00 to 51.00
Rails, 18 in. and under	67.00 to 68.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	46.00 to 47.00
Cast iron car wheels	50.00 to 51.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	54.00 to 55.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	21.00 to 22.00
Low phos. 18 in. and under	49.00 to 50.00
Rails, random length	54.00 to 55.00
Rails, 18 in. and under	62.00 to 63.00
No. 1 cupola cast.	49.00 to 50.00
Hvy. breakable cast.	42.00 to 43.00
Drop broken cast.	57.00 to 58.00

Youngstown

No. 1 hvy. melting	$47.50 to $48.50
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	47.50 to 48.50
No. 2 bundles	29.00 to 30.00
Machine shop turn.	20.50 to 21.50
Shoveling turnings	25.50 to 26.50
Low phos. plate	48.50 to 49.50

Cleveland

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	35.50 to 36.50
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	25.50 to 26.50
No. 1 busheling	44.00 to 45.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Cut structural & plates, 2 ft & under	50.00 to 51.00
Drop forge flashings	44.00 to 45.00
Low phos. punch'gs plate	45.00 to 46.00
Foundry steel, 2 ft & under	43.00 to 44.00
No. 1 RR hvy. melting	47.50 to 48.50
Rails 2 ft and under	65.00 to 66.00
Rails 18 in. and under	66.00 to 67.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	60.00 to 61.00
No. 1 machinery cast.	59.00 to 60.00
Stove plate	51.00 to 52.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	215.00 to 225.00
18-8 turnings	100.00 to 110.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 busheling	36.00 to 37.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	20.00 to 21.00
Low phos. plate	44.00 to 45.00
Structurals and plate, 2 ft and under	44.00 to 45.00
Scrap rails, random lgth.	42.00 to 43.00
Rails 2 ft and under	52.00 to 53.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	26.00 to 27.00
No. 1 RR hvy. melting	44.00 to 45.00
Rails, random lengths	52.00 to 53.00
Rails, 18 in. and under	57.00 to 58.00
Angles and splice bars	50.00 to 51.00
RR specialties	49.00 to 50.00
Cupola cast.	52.00 to 53.00
Heavy breakable cast.	45.00 to 46.00
Stove plate	44.00 to 45.00
Cast iron car wheels	48.50 to 49.50
Rerolling rails	60.00 to 61.00
Unstripped motor blocks	45.00 to 46.00

Birmingham

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	40.00 to 41.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	44.00 to 45.00
Structural and plate, 2 ft.	44.00 to 45.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	53.00 to 54.00
Rails, 18 in. and under	57.00 to 58.00
Angles and splice bars	49.00 to 50.00
Rerolling rails	61.00 to 62.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	42.00 to 43.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 2 dealer bundles	20.00 to 21.00
Machine shop turnings	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	22.00 to 23.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	37.00 to 38.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 prepared solids	200.00 to 205.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	21.00 to 22.00
No. 1 bushelings	37.00 to 38.00
Drop forge flashings	37.00 to 38.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	21.00 to 22.00
Heavy breakable cast.	40.00 to 41.00
Mixed cupola cast.	47.00 to 48.00
Automotive cast.	51.00 to 52.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	105.00 to 110.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	12.50 to 13.50
Shoveling turnings	16.50 to 17.50
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	41.00 to 42.00
Mixed cupola cast.	35.00 to 36.00
Heavy breakable cast.	35.50 to 36.50

San Francisco

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	36.00
No. 1 dealer bundles	36.00
No. 2 bundles	22.00
Machine shop turn.	$17.00 to 19.00
Cast iron borings	17.00 to 19.00
No. 1 cupola cast.	48.00

Los Angeles

No. 1 hvy. melting	$41.00
No. 2 hvy. melting	$35.00 to 36.00
No. 1 dealer bundles	36.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Elec. furn. 1 ft and under (foundry)	49.00 to 50.00
No. 1 cupola cast.	47.00 to 48.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	36.00
No. 2 bundles	26.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$47.00 to 48.00
Unstripped motor blocks	34.00 to 35.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	33.00 to 34.00

Too Many Unions Plague Copper

Producers can't look very far ahead with confidence until they smooth out their labor problems.

Here's how this perennial headache is now hurting Kennecott in Utah.

▪ One of the major, long-range problems of the U. S. copper industry is now being graphically demonstrated at Kennecott Copper Co.'s Utah Div.

Simply stated, the companies have to negotiate with too many militant unions in situations that they compete against each other as well as management. And in too many cases, an unhappy handful can close an entire operation.

Until the industry can smooth out its labor problems, it can never look very far ahead with any great assurance of stability in supply or markets.

Here's the picture at Kennecott: In Utah, Kennecott workers are represented by 20 different unions. To date 17 unions, representing 5721 workers, have agreed to new contracts with the company. But the pits and mills are still idle.

No Work—Three crafts unions, speaking for 835 workers, and the company have deadlocked in their talks. Other union men won't cross the picket lines.

The situation appeared gloomy early in the week. Utah's Governor George D. Clyde tried to arouse public opinion, pointing out the strikes had cost the state $56 million and was upping this total by $340,000 each additional day the operation was idle.

Federal mediators pressured for marathon talks last week. But it didn't appear to have helped.

Settlement Soon—Some insiders, however, are saying settlement isn't as far off as it may appear. They say that leaders on both sides have confided they are looking for grounds for honorable compromise.

The pits and mills may be humming again before too much longer. But some in the trade wonder how long before a handful of unhappy men will start it all over again.

Reports from Salt Lake City, site of the talks, is that the stumbling block is a No-Strike clause. Actually it's only part of the clause.

Problem Clause — The company insists the unions agree not to strike, or participate in strikes, for duration of the contract. A labor source indicates the unions would sign if the "participation" part were deleted.

They maintain that the clause would force them to cross picket lines and risk bodily harm. The company says it's important so they can keep operating and improving efficiency.

"Now," says one company spokesman, "if we buy a new, streamlined piece of equipment that requires two men to operate it, and the union insists on three men, we have no recourse."

Some in the trade believe the three unions will have to give in on this point because the other 17 (including the major unions) agreed to it. As soon as they do, the other problems should be solved easily.

Zinc

The zinc industry weathered the steel strike pretty well. The American Zinc Institute round-up of 1959 says business was up about 8.7 pct for the year.

Final totals haven't been made yet. But AZI estimates zinc consumption in 1959 at about 944,000 tons.

The only market to use less zinc was the galvanizers. Their consumption of 355,000 tons was 25,000 less than the previous year.

The AZI figures that without the steel strike the galvanizers would have used about 435,000 tons of zinc.

Aluminum

The National Assn. of Aluminum Distributors is looking for about 14 pct better business in the first half of 1960. This would be a continuation of the trend.

Directors of the association at their latest get together, figured that business in 1959 was about 24 pct better than 1958. And aluminum sales in December were 29 pct over December 1958.

Tin prices for the week: Jan. 20 —100.375; Jan. 21—100.50; Jan. 22 — 100.50; Jan. 25 — 100.375; Jan. 26—100.375.*

* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	35.00	33.00	12/23/59
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; O ther primary prices, pg. 133.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250-3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size"	¼	⅝-⅞	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $7.25-$8.50; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$6.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $7.55-$9.50; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.40
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base ... $ 1.31
Cobalt, 97-99% (per lb) ... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 33.30 to 42.00
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $211 to $213
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz.. $77 to $80
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.75
- No. 120 ..... 29.25
- No. 123 ..... 28.75

80-10-10 ingot
- No. 305 ..... 35.25
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 44.00
- No. 215 ..... 40.75
- No. 245 ..... 36.00

Yellow ingot
- No. 405 ..... 24.75

Manganese bronze
- No. 421 ..... 29.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 26.25-26.50
- 0.60 copper max. 26.00-26.25

Piston alloys (No. 132 type).. 28.00-29.00
No. 12 alum. (No. 2 grade)... 24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)... 26.00-26.25
AXS-679 (1 pct zinc) 25.00-26.00

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26¼	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	29¾
No. 2 copper wire	26½
Light copper	24¼
*Refinery brass	24¾
Copper bearing material	24

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27½
No. 2 copper wire	26
Light copper	24
No. 1 composition	23
No. 1 comp. turnings	22½
Hvy. yellow brass solids	16¾
Brass pipe	16¼
Radiators	18
Aluminum	
Mixed old cast.	14½—15½
Mixed new clips	17 —17½
Mixed turnings, dry	15 —16

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	26 —26½
No. 2 copper wire	23 —23½
Light copper	21½—22
Auto radiators (unsweated)	14½—15
No. 1 composition	18½—19
No. 1 composition turnings	17 —17½
Cocks and faucets	15 —15½
Clean heavy yellow brass	13 —13½
Brass pipe	15 —15½
New soft brass clippings	15¼—15¾
No. 1 brass rod turnings	12½—13

Aluminum

Alum. pistons and struts	7½— 8
Aluminum crankcase	11¼—11¾
1100 (2s) aluminum clippings	15 —15½
Old sheet and utensils	11¼—11¾
Borings and turnings	7 — 7½
Industrial castings	11¼—11¾
2020 (24S) clippings	12½—13

Zinc

New zinc clippings	7 — 7¼
Old zinc	4½— 5
Zinc routings	3¼— 3½
Old die cast scrap	2¾— 3

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	28-29
Clean Monel turnings	20-23
Old sheet Monel	24-26
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed	15

Lead

Soft scrap lead	8 — 8¼
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	75 —76
No. 1 pewter	55 —56
Auto babbitt	39 —40
Mixed common babbitt	9¾—10¼
Solder joints	13¼—13¾
Siphon tops	41
Small foundry type	9¾—10¼
Monotype	9¾—10¼
Lino. and stereotype	8¾— 9
Electrotype	7½— 7¾
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	2¼— 2¾
Electro dross	2¼— 2¾

(Effective Jan. 25, 1960)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1; C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Jan. 25, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective Jan. 25, 1960)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. **Base prices**, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr'a. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Roadville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.675 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Jan. 25, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B.. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (net) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	+10.75	+26.00	+7.75	+22.00	+4.25	+17.50	+1.75	+16.75	+1.25	+15.75	+0.75	+15.25	0.75	+15.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Alton, Ill. *L1*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling *W5*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Indiana Harbor *Y1*	1.25	+14.0	4.25	+10.0	7.75	+5.50	10.25	+4.75	10.75	+3.75	11.25	+3.25	12.75	+3.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	+6.25	.....	+2.25	.....	0.75	.....	1.25	.....	1.75	.....	2.25	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Alton, Ill. *L1*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Wheeling *W5*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Indiana Harbor *Y1*	5.75	+8.0	9.75	+4.0	12.75	0.50	13.25	+0.75	13.75	0.25	14.25	0.75	14.75	+0.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

(Effective Jan. 25, 1960)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2

High-carbon chromium.. .955 D-3, D-5
Oil hardened manganese .505 O-2
Special carbon ..... .38 W-1
Extra carbon ..... .38 W-1
Regular carbon ..... .325 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective Jan. 25, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Base Ties Col	Galv. Barbed and Twisted Barbless Wire Col	March. Wire Ann'ld ¢/lb.	March. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	187	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***...	173	190	177	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.60	10.15
Rankin, Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
Sparrows Pt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.50
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	48.25
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

	Full case or Keg price
Nuts, Hex, HP reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller 65

Rivets *Base per 100 lb*

½ in. and larger $12.85

Pct. Off List

7/16 in. and smaller 15

Cap Screws *Discount (Packages)*

Full Finished H. C Heat Treat

	Full Case
New std. hex head, packaged	
⅝" diam. and smaller x 6" and shorter	54
¾", ⅞", and 1" diam. x 6" and shorter	38
⅝" diam. and smaller x longer than 6"	..
¾", ⅞", and 1" diam. x longer than 6"	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. — 25,000-and over	60	..
5/16 to ½" diam. incl. — 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk		
⅜" diam. & smaller — 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited	40.00
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	19.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	27.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery† Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	$.10	9.90	10.10	10.16	11.55	10.00	10.65	10.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.91	9.79	10.00	9.59	13.14	16.76	.....	.....	.....
Boston**	.10	10.52	11.27	11.87	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.19	21.04
Buffalo**	.15	9.80	10.50	11.40	11.30	10.25	10.40	9.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.10	10.35	8.62	9.16	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.69[1]	9.89	11.09	10.47	8.88	9.67	8.90	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		9.65	9.65	.....	10.85	9.65	9.35	8.90	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	8.74	10.27	11.37	9.05	9.44	9.46	9.54	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.10	14.20	18.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	8.83	10.49	11.24	10.49	8.76	9.30	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.27	10.59	11.45	9.74	9.87	9.84	10.09	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.99	9.35	9.25	9.20	9.50	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.69	9.84	10.91	10.45	8.62	9.78	8.79	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.50	12.25	11.00	10.95	10.75	15.20	18.30	16.35	22.90	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.79	10.73	11.48	10.45	8.73	9.40	8.90	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	8.95	9.46	10.69	10.47	8.75	9.48	8.85	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅜" to 2⅞"; cold drawn—15/16" to 2⅜" round; Hot-rolled 4140—⅞" to 2⅞" round. cold drawn—15/16" to 2⅜" round.

†† 10¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

(Effective Jan. 25, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

(Effective Jan. 25, 1960)

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Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.70
Ton lots packed in bags	16.10

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	10 lb, pig	35 lb, down
16 to 19%	3% max. ...	$98.00	$96.00
19 to 21%	3% max. ...	100.00	98.00
21 to 23%	3% max. ...	102.50	100.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk	34.25
Ton lots, palletized	36.25
250 to 1999 lb	39.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	(Bulk) 37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C.	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk	11.60
Ton lots, packed	13.25
Carloads, bulk, delivered, per lb of briquet	14.00
Briquets, packed pallets, 2000 lb up to carloads	16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective Jan. 25, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk..	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Granal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

GUARANTEED—RE-NU-BILT

Electric Power Equipment—A. C. Motors

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1750	G.E.	M-579B8	4800	1800
1	1500	G.E.	MT	6600	1187
1	800	Whse.	CW	550	1776
1	600	Whse.	CW	220/440	900
1	600	Whse.	CW-4-32D-15	440	1778
1	500	Whse.	CW	550	350
1	300	A.C.	ANY	440/2300	720
1	300	G.E.	MTP561	2200	1800
1	200	G.E.	IM	440/2200	589
1	125	G.E. unused	MT-557	220/440	1200
1	100	G.E.	MT-564	440/220	450
1	250	G.E.	IM-16	220/440	875
1	250	A.C.	ANY	550	600
1	250	Cr. Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	IE-13B	220	1800
2	200	Whse.	CW-890	2300	1775
2	200	G.E.	IM-17A	2200	435
3	100	A.C.		440	695

SQUIRREL CAGE

1	500	G.E.	FT-559AY	2200	3600
1	500	Whse.	CS-1115	2200	863/445
4	500	Whse.	CS-1216	2200	500
2	450	Ell.	F-7910	2200	1200
1	400	Whse.	CS-7151-610H	6600/4000	3585
1	300	Whse.	CS-1002	2300/440	600
1	250	Whse.	CS-8758	2200	1775
1	200	Whse.	CSP-5818	440	3450
2	200	Whse.	CS-8558 D.P.	220/440	1750
1	150	G.E.	FT-558	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-764C	220/440	1160
3	100	Whse.	CS-760C	2200/440	1100
1	100	Whse.	B.B.CS-607	220/440	1780

SYNCHRONOUS

1	6000	G.E.	ATI .8 P.F.	2200/6600	600
1	3500	G.E.	TS 1.0 P.F.	4600/2300/4000	360
1	2000	G.E.	ATI	2300	900
3	1750	G.E.	ATI	2300	3600
1	1750	G.E.	TS	2300/4600	900
1	700	G.E.	TS .8P.F.	2300	1200
1	350	Whse.	1.0P.F.	440	900
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(2) 300-H.P. Whse. Motors, 230-V.D.C. 300/600 R.P.M. with

(1) 600-KW., Gen. Elec. 3-unit M.G. Set (2) 300-KW. Generators & 750-H.P. Syn. Motor, 4160/2300-V., 3 ph., 60 cy. & Mag. F.V. starting equipment.

(Any above items can be purchased separately)

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1*	2200	Whse.	600	92/132
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1*	2000	G.E.	350	230/350
1*	1750	G.E.	600	200/300
1*	750	Whse.	250	200/400
4*	700	Whse.	250	300/700
2*	645	S & S	300	1000
1	600	Whse.	250	110/220
2	235	Whse.	230	325/975
1	150	Whse.	230	400/1200
1	125	Whse.	230	450/900
1	35/110	G.E.	250	255/1650
1	75	Whse.	230	250/1000

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Cleveland Sales Start to Climb

Used machine sales in the Cleveland area have started to climb since the end of the steel strike.

Though the strike had some bad effects on sales, prices held firm.

■ Settlement of the steel strike has already had its impact on the used machinery business with a spurt in inquiries and orders.

"We are only 4-years-old but are looking for the best year in our history with settlement of the strike," says Arthur Markell, president of Buckeye Machinery Co., Cleveland.

Not All Bad—"Quite a few firms put off buying machinery for their plants simply because they didn't have the steel in sight. They didn't know when or how they could get it and didn't know when their customers would be shut down. So a lot of them held off and have only become interested again in the last few weeks since the strike was settled and their pattern of orders was re-established."

The record steel strike still had several bright spots for used machinery firms. To no one's surprise steel service centers did a booming business. But many had to hastily install more fabricating machinery to handle it. So used machinery dealers did a rushing business with steel warehouses who were in a hurry for shears, levellers, slitters and similar processing equipment.

More Need—Semi-processing by steel warehouses has blossomed in recent years because they can utilize higher speed equipment and re-use scrap where individual smaller firms would find it uneconomic to invest in such tools. With many, over half the tonnage shipped out has processing work in it. So the need for machines to handle it has grown proportionately.

Another bright spot for machinery dealers in the strike was that despite the business drop-off, prices held firm. They are now about the same as a year ago and quality and availability are as good as they have been in years. Prices at government and private auctions have also held up although the number has declined.

Top Billing—Items most needed by customers now are machine shop equipment like lathes, milling machines and grinders of all sizes. Second most popular class is fabricating equipment like punch presses and shears.

Buckeye Machinery was founded 4 years ago by Mr. Markell. He previously was associated with a Detroit machinery liquidating firm. About 90 pct of Buckeye's business is done out of the city in Illinois, Indiana, Missouri and Ohio. Most prospective buyers come to inspect machines before purchase so there is no misunderstanding. The national multiple listing service of the Machinery Dealers National Association has also been helpful in locating wanted machinery. Each week the listing has grown as dealers become more enthusiastic.

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3½" Rd	Hot Form #1	12,800#
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SIZE	TRADE NAME	WEIGHT
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3" Rd	Carp. "K.W."	24,000#
.655 Rd.	AMS 5132	16,000#
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311 CFM	1500 psi	10½-7¼-3½ x 13 Ing.	ES-3
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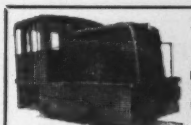

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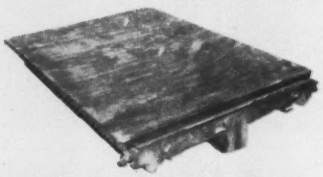

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An asterisk indicates that a booklet, or other information, is offered in the advertisement.

This index is published as a convenience. No liability is assumed for errors or omissions.

A

Allan Wood Steel Co. 124
All Metals Pickling Corp. 145
*Allegheny Ludlum Steel Corp. .. 4
Aluminium Limited Sales Inc. 14
American Air Compressor Corp. 143
American Brass Co. 70
American Messer Corp. 26-27
*American Polyglas Corp. 129
American Society for Metals ...38-39
*Armco Steel Corp. 6

B

Baltimore & Ohio Railroad..... 110
Belyea Co., Inc. 142
Bertsch & Co. 120
Bethlehem Steel Co. 1
Birdsboro Steel Foundry & Machine Co. 146
Bridgeport Brass Co. 22-23
Buell Engineering Co. 16

C

Calumet Iron & Supply Co. 145
Carlson, G. O., Inc. 105
Carmet Div., Allegheny Ludlum Steel Corp. 4
Clark Bros. Co., One of the Dresser Industries 84-85
Colorado Fuel & Iron Corp. ...28-29
*Commercial Shearing & Stamping Co. 12
Consumers Steel & Supply Company 145
Copperweld Steel Co., Aristoloy Steel Div. .....Inside Front Cover
Crucible Steel Co. of America. 80-81
Cutler-Hammer Inc. .....Back Cover

D

*Du Pont de Nemours, E. I., & Co., Inc. 17-20

E

Eastern Machinery Co., The 143
Equitable Equipment Co., Inc. .. 143
*Erie Foundry Co. 32
Eveready Supply Co. 143

F

Foote Bros. Gear & Machine Corp. 82
Foote Mineral Co. 62
Formed Steel Tube Institute 61

G

General Electric Co., Industry Control Dept. 122-123
General Ore & Chemical Corp... 145
Globe Trading Co. 143
Goodman Electric Machinery Co. 143
Goodyear Tire & Rubber Co., Industrial Products Div. 10
Goss & DeLeeuw Machine Co. ... 140

H

Hayes, C. I., Inc. 13
Hughes, Arnold, Co. 144, 145
Hyman, Joseph, & Sons 144

I

Iron & Steel Products, Inc. 143

K

Kaiser Engineers 72
Keystone Plumbing & Supply Co. 144
Keystone Steel & Wire Co. 113
Kidde, Walter, & Co., Inc. 15
Kinderman, Lou. F. 144
Kingsbury Machine Tool Corp. .. 74

L

*Lamina Dies & Tools, Inc. 109
Lamson Corp. 116-117
*Leeds & Northrup Co. 114

M

MacCabe, T. B., Co. 142
Marshall Railway Equipment Corp. 144
Miles Machinery Co. 143
Minnesota Mining & Mfg. Co., Adhesives, Coatings & Sealers Div. 127
*Morgan Construction Co. 5
Morrison Railway Supply Corp... 144

N

National Machinery Exchange .. 143
National Malleable & Steel Castings Co. 69
*National-Standard Co. 33-36
New Britain-Gridley Machine Div., New Britain Machine Co. 53-54
*New Britain Machine Co. 53-54
*Norton Co., Abrasive Grinding Wheel Div. 88

O

Ornitz Equipment Corp. 144

P

Porter, H. K., Co., Inc. 78
Production Carbide & Steel Co... 145

R

R-S Furnace Co., Inc. 11
Rail & Industrial Equip. Co., Inc. 144
*Republic Steel Corp. 86-87
Riverside-Alloy Metal Div., H. K. Porter Co., Inc. 78
Roebling's, John A., Sons Corp... 77
Ryerson, Jos. T., & Son, Inc. 8

S

Saint Joseph Lead Co. 66
Selas Corp. of Americe 30-31
Sherwin-Williams Co. 79
Smith, A. O., Corp. 106-107
*Standard Oil Co. of Indiana..24-25
Sumitomo Metal Industries, Ltd... 121

T

Tempil Corp., Engineering Sales Div. 108
Timken Roller Bearing Co. 64
Trabon Engineering Corp. Inside Back Cover

U

Udylite Corp. 37, 40
United States Rubber Co., Mechanical Goods Div. 119
United States Steel Supply Div., U. S. Steel Corp. 21
Universal Machinery & Equipment Co. 143

W

Wallack Bros. 145
Warren Iron & Metal Co. 144
*Wean Equipment Corp. 42
Weiss Steel Co., Inc. 145
Wender Presses, Inc. 145
Wheland Co. 129
Whisler Equipment Co. 144
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp. 28-29

Z

Zak Machine Works, Inc. 140

CLASSIFIED SECTION

Clearing House 142-144
Contract Manufacturing Appears in first and third issue of each month. See Jan. 21 & Feb. 4.
Employment Exchange 144
Equipment & Materials Wanted.. 145

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Extrusion Presses for aluminum, magnesium, copper, titanium, brass, steel . . . 1,000 to 12,000 tons . . . production primed

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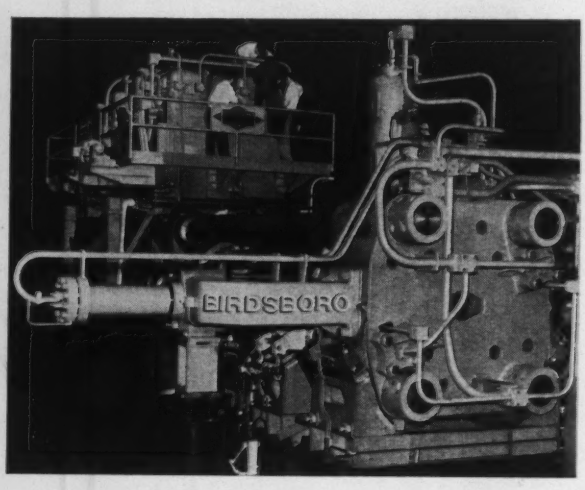
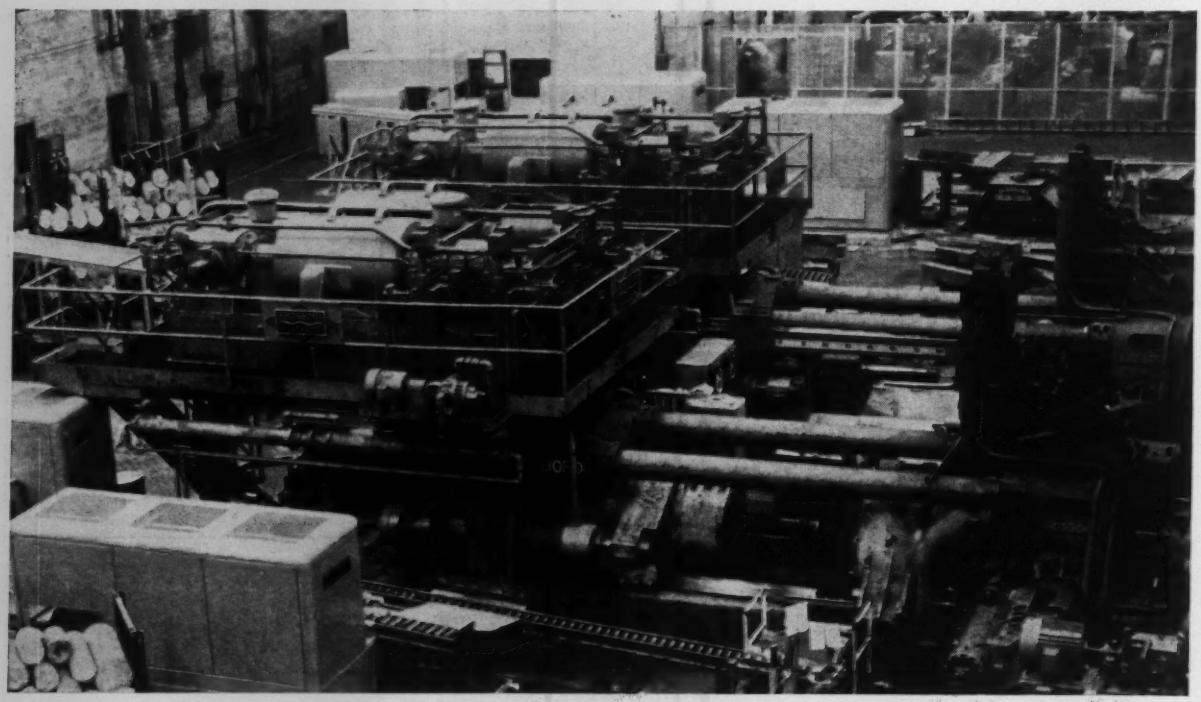
For example, the press shown to the right is an unusually fast-acting 3,000-ton oil hydraulic extrusion press that substantially reduces dead cycle time. A unique die slide arrangement provides an alternate location for inserting, removing, dressing or adjusting a second die while extrusion continues uninterrupted.

The press shown below is another example. This 2,750-ton self-contained, oil hydraulic four-column aluminum extrusion press is engineered to extrude shapes from billets of 8 to 12 inches in diameter, and up to 32 inches in length.



Contact your BIRDSBORO representative for a more comprehensive picture. *Sales Department:* Reading, Pa., *Engineering Department and Mfg. Plant:* Birdsboro, Pa. *District Office:* Pittsburgh, Pa.



HP44-60

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There's nothing so terrifyingly quiet as a Boltmaker out of action. Yet to lubricate this Boltmaker by hand with its 26 grease points would take at the very minimum 10 minutes. That's equal to the time it takes to produce 1,000 bolts. Repeat this downtime for a month and you're talking big money. That's why you see a Trabon Centralized Lubricating System installed here to prevent lubrication shutdowns from taking place. Trabon delivers a measured amount of clean lubricant to all bearings — no matter where located. Trabon lubricates while the Boltmaker operates . . . eliminating downtime. Trabon saves man hours, bearing repairs, lubricant. No matter how large your machine — no matter how **new or old** — Trabon will help it produce more thus lowering your unit costs. Let us tell you more about how Trabon can improve the performance of your machines.

Digesting heavy wire and ejecting rugged high quality bolts is this National Machinery Boltmaker at an Ohio bolt manufacturing plant. A Trabon Manual Centralized Lubricating System (outlined in white) protects vital grease bearings by keeping them supplied with clean lubricant in exact measured amounts.

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Single, weatherproof operating coil easily accessible and reversible. Leads can be brought out in either direction.

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